Post Occupancy Evaluation: A Comparison between Design and Occupation Case Studies: Public Housing Alterations in Tripoli

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By

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Post Occupancy Evaluation: A Comparison between Design and Occupation
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ABSTRACT

This research is an attempt to investigate the phenomenon of public housing alterations and changes that have been carried out by the owners of these houses. In spite of many studies having been undertaken investigating public housing in Libya, no study has dealt specifically with this phenomenon. The key theme raised in this research is: What types of alterations have Libyan public housing owners carried out in their dwellings and what are the reasons for these alterations?

To evaluate this theme, a POE approach has been adopted which consist of three main stages. The first stage includes three chapters, highlighting topics whose aim is to understand the context of Libya from its historical, economical and social circumstances, followed by an exploration of the dwelling alteration phenomenon, highlighting issues that were addressed in the literature it. Then the researcher moves towards the post occupancy evaluation approach, its origin, definitions and applications.

The second stage, which deals with the research design and methodology, includes three chapters, and it is the planning stage of the research. The model of investigation was introduced, data collection techniques were discussed, as well as the types of analysis used in the research. Three types of analysis were used: firstly, Statistical Package for

Social Science (SPSS) was used to analyse data which was collected in the field survey. Two types of analysis were executed with SPSS: descriptive analysis and principal component analysis (factor analysis). The aim of this analysis is to simplify data and to elicit predictors which indicate the main satisfaction factors and the relationship between these factors and alterations carried out by residents. Secondly, Space Syntax Theory, a comparison was run between the distribution of the original planned spaces and the modified spaces for the same design. The third technique is piling which has been used for the open-ended questions addressed in the questionnaire.

Data analysis which is introduced in Chapter Six suggests a field of discussion that is indicated, but not completely explained, by the alterations people do to their homes. In other words, the post occupancy evaluation has provided a range of observation that has led to a more theoretical discourse which forms stage three in this research, and to trying to identify what 'the home' signifies to its users. In addition, a theoretical framework introduced in Chapter Eight and Nine includes two main theories, human needs theory which was introduced by Maslow in 1954 and Structuralism; the first used to understand users needs and motivations, the latter used as a tool to understand the deep and surface structures of the home.

The findings of the research emerged from both its theoretical and empirical aspects. These findings are divided into three dimensions: the first one is oriented towards the importance of adopting POE as an approach suitable at governmental and academic levels. The second dimension was oriented to the dwelling design criteria which will improve the public housing in Libya. The third dimension is oriented towards the main contribution of this research which is needed to study dwelling alterations. Four factors considered as an area of investigation for such phenomenon.

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DEDICATION

To all those I love

My mother and father

My family

Zakaria, Salim and Abd-elkader

and

to all those came before us and made it easy for us.

To all those will come after us who might find it easier.

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General Introduction

Preface

This thesis is produced as an expression of my personal feelings and experiences in both professional and academic fields. Firstly, as an architect, dealing with the construction and supervision of the built environment, during the 1980s and mid 1990s for the Libyan government in Yefren and Tripoli municipalities, working on government plans. Secondly, dealing with students in El-Fatah University's, Department of Architecture and Urban Planning. It was these experiences that led the author to the view that the Libyan built environment is not fully understood by the professionals involved in it, at the same time, professional attitudes were limited in their approaches to understanding and learning from the built environment.

Origin of the research problem

Before introducing the research aims and methodology, the author wishes to highlight some concepts related to the origin of the research idea and its forces which have prompted him to undertake this study.

The problem is located on two main levels: on the level of the built environment, which concentrates on public housing in Libya, and on the academic level where the researcher has undertaken his career; both levels are discussed in the following pages.

Built environment level

Libya, especially the Tripoli region, has been undergoing a rapid process of population growth and urbanisation for several decades. This has forced the government to address the shortage of housing through accelerated housing production systems and to establish different housing projects. These projects have been designed, constructed and developed within a conceptual framework that has been based purely on economic, utilitarian, and technical considerations. In terms of their realisation, however, the quality of both the residential units and the structure of the city has been badly affected. One recent housing issue is the growing demand among residents for better quality housing.

In most of these projects, the dwellings were designed to a standard model and the design stage was undertaken without consultation with the intended occupiers and an incomplete understanding of their needs. In the early stages of housing production

particularly, the designers came from a very different socio-economic stratum to those of the users. Moreover, the different types of occupants and their changing needs over time were not considered in the dwelling provision, nor were demographic and social changes in household composition. In other words, housing programme efforts were directed towards meeting a quantitative housing shortage and paid little attention to qualitative provision.

The design, construction and occupancy of the built environment is a complex phenomenon. It includes social, economic, technical, functional as well as political systems. These interrelated systems present both constraints and opportunities. To resolve housing problems, many disciplines have to come in to play and their insights must be synthesised into an approach that can match housing need to housing provision.

The view of the Libyan government in the 1970s and 1980s was that it could control the housing problem by a massive injection of funds into new housing construction for families or by commercial loans. The failure of these initiatives served a useful purpose; it highlighted the importance of the individual's contribution to improving and providing homes for their families by altering their dwellings which had been provided by the government.

Libyan public housing decision-makers in the 1970s and 1980s viewed housing in terms of providing a number of housing units on the basis of generic families, and at minimum cost. This model neglected the complexity of the many interrelated issues that must be addressed and synthesised if appropriate mass housing provision were to match various needs. Unless decision-makers consider such complexities, inevitably, owners will want to alter their dwellings to satisfy their changing needs. Research has shown that housing schemes that do not provide spaces for community social activities nor adequately meet needs at the individual dwelling level arise as a result of a misinterpretation of dwelling function on the part of decision makers, and professionals and subsequently, the reality of what that means for users in terms of housing not adequately meeting their needs, resulting in their altering their dwellings. This prompted the author's particular interest in this subject, which is how residents alter their dwellings to meet their needs. The objective of this review is to rethink dwellings, to recognise them from the inside, not outside, such that the decision-maker's concept of house is brought closer to the owner's concept of home.

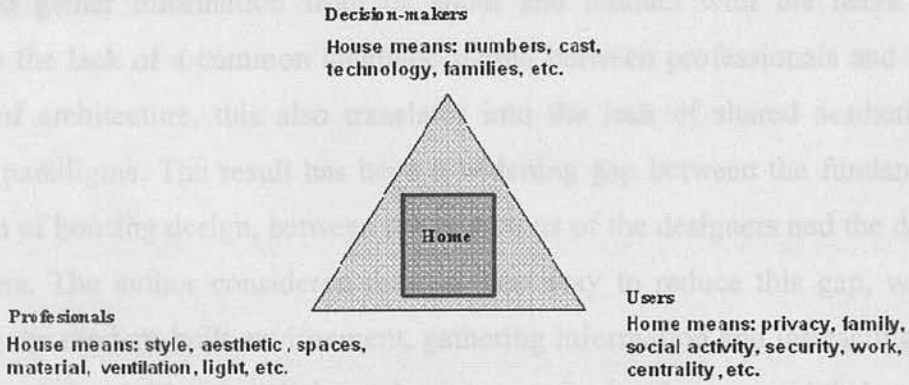

Figure 1 Different visions of the home

Academic level

Architectural education started in Libya in 1969 in a small unit in El-Fatah University Faculty of Engineering, the Department of Architecture and Urban Planning, where the author now works as a lecturer.

Experience in this academic setting showed the author that there was no systematic way to deal with data collection for academic purposes, especially in design situations, where the students need to interact with people, culture and spaces. All students depend on what they gain during the education process. At the same time, they do not always have the desire to read as much as they can or at least to explore ideas beyond those that allow them to pass the exam. There is no course concentrating on the interaction between design professions and society, nor on ways of eliciting information from people and places, especially in terms of user satisfaction and building performance.

> ''Education is not neutral; the exchange between teacher and student does not take place in a vacuum. People bring with them their cultural experience and expectations. Education needs to take as its starting point the real life and experiences of people and then reinforces the social conditions that keep them as passive receiver of information and knowledge, or directly challenges these conditions. Learners enter into the process of learning not by obtaining facts, but by constructing reality in social exchange with others'' (Brown & Moreau, 2004)

In Libyan architectural education, there is no systemic programme that encourages students to gather information from or about and interact with the users. This entrenches the lack of a common language shared between professionals and users. In terms of architecture, this also translates into the lack of shared aesthetics or particular paradigms. The result has been a widening gap between the fundamental conception of housing design, between the intentions of the designers and the desires of the users. The author considered that the best way to reduce this gap, was by evaluating the modern built environment, gathering information and interacting with the users, and thus initiating a dialogue between professional, users and their culture in its broad context. The intention, however, was not to criticise the educational system in Libya. Rather, the author viewed it as an opportunity to find a way to improve the system of closing the gap between professionals and users. For the architectural profession in Libya, the changes in society have been particularly challenging. The current design and construction systems have been perceived by all interested parties as inefficient and controversial. New approaches are needed about how buildings are produced, notably in terms of: matching design and construction, the recognition of a need for economy of means and scale, and increasing participation by clients and end users in the design process. These challenges suggested to the author a need for new ways of thinking and working.

The performance of a building is gauged by a variety of groups including those using the building and those responsible for its construction (Preiser, 1989). Architects often measure success in different terms than their clients, who may, in turn, perceive the building differently to building users, who then view it differently to contractors.

It is therefore important to educate architects to engage with the built environment and its users, in order, to achieve a discipline in which it is standard practice to investigate, analyse, understand and interpret the final production of their design. Libyan architecture education then can do much to bridge the gap identified above with a link.

The intention

The aim of professionals in architecture and urban planning is to improve the built environment. Many ways can contribute to achieving this goal, bearing in mind the complexity of the built environment and the variety of participants within the countless overlapping organisations and cultural subsystems which make decisions

regarding the built environment and, perhaps, make it more difficult to understand it clearly. Therefore, scholars and professionals, especially in the last fifty years have generated a range of alternative strategies which enable a departure from the traditional methods of scientific inquiry. One of these strategies is post occupancy evaluation.

In an attempt to measure systematically building performance, in terms of the extent to which the built environment does not satisfy requirements, post occupancy evaluation (POE) emerged as a distinct research area in the early 1960s (Preiser *et al*, 1988). Various conceptual and procedural models have been devised and implemented over the years to capture failures and successes and feed this information back to decision makers (Law, 1981). Since its beginning, POE has attempted to enhance the quality of the built environment on the basis of assessing the contentment of its users, rather than on the criteria put forward from the professionals. So, what does POE mean?

Research strategy

The research strategy can be divided into two main parts:

- Learning about it as a discipline; and
- Using POE as a tool for investigation in a context where it has not been tested, and regarding these findings as a contribution to the field of POE.

The first commitment regarding the understanding of the approach can be achieved by literature inquiries and extensive reading about the history, philosophy and methodology of this discipline. Many definitions of POE exist, but in general, it can be described as follows:

> A post occupancy evaluation (POE) is an assessment process that can be applied to any type of environment. A POE is a short-term process that seeks to identify major project successes and failures. (Sanoff, 1994:16)
>
> Evaluation is more than a list of problems and weaknesses in a building (or built environment). It also identifies features that are working well and appreciated by the occupants (Sommer, 2003, 5)

POE is important, because it adds local contextual data to state of the art knowledge of a given building or built environment type. In the case of Libya, many studies have been carried out using other disciplines but no study has been oriented to POE.

The second commitment of the author is thus to apply this approach as a case study methodology. This first required the author to construct a model to investigate the problems that are specific to the Libyan built environment. By learning about POE then applying it in a case study, the author intends to better understand this discipline in its broadest meaning.

Dwelling alterations

Numerous problems are evident in the Libyan built environment, but the main one which gives rise to the strategy of this research, and which is investigated in this thesis, is that of dwelling alterations. The author's experience and knowledge of new housing in the Tripoli region is that many residents have put many resources, in terms of time, effort and expense, into re-shaping dwellings provided by the government. Questions about these changes, what caused them, what people wish to achieve through them, and whether they show underlying problems and traits in dwelling typology, form the core of this research. Alterations, by their very nature, provide a critique of the provided housing that is simultaneously quantitative, qualitative and user-oriented.

The author then needed to know what type of alterations owners carried out, and why. Were they satisfied with the features of domestic space? Were these alterations due to the lack of understanding of the social structure of Libyan families? Did the internal spaces fulfil the needs of Libyans families? What types of experience could be learned from these alterations to help to produce more suitable dwelling designs?

Generally, this research does not aim to produce ultimate solutions to the problems intrinsic in providing housing on a massive scale. Instead, it aims to create an overview of Libyan occupiers' attitudes and their interaction with their homes. Naturally, this will have an impact on design recommendations within the context of Libyan culture, provide a clear idea of the research, supported by an explanation of the past and create learning opportunities from the experience of Libyans and their way of adapting themselves within their homes.

Justification for the research

The research is necessary for two main reasons:

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- It lies at the heart of the perceived problems within the Libyan built environment and academic fields which are significant to Libyan society as a whole.
- There is a shortage of POE inquiries in Libya and a lack of information about the dynamics of Libyan built environment in the literature.

Most of what has been done using POE has focused on buildings and the immediate surroundings and does not relate to the holistic context of housing as a policy or the principle which will improve the housing system in general. The shortage of information about dwelling alterations can be seen very clearly in third world countries.

This research has implications for those responsible for the design, construction and teaching of architecture and users, especially, of government-built housing units where the user has had no opportunity to participate in the design stages.

Research aims

This research has several aims:

- To synthesise an understanding of the theoretical, philosophical and historical approaches of post occupancy evaluation, its roots and applications;
- To determine the amount of improvement carried out by the residents in their housing;
- To determine the type of improvement carried out by the residents and the values of these activities to them;
- To determine the residents' attitudes and evaluations of their homes and how these relate to their alterations;
- To build up a data resource of the recent changes in Libyan houses over time and the motivations and reasons behind these changes.
- To build a conceptual model based on evaluation of public housing alterations carried out by the owners; and finally,
- To try to improve dwelling design and the appropriateness of dwelling spaces in Libyan public housing.

Research model

The main research question could be expressed as follows:

> **What types of alterations have Libyan public housing owners carried out in their dwellings and what are the reasons for these alterations?**

To address this question, a post occupancy evaluation approach has been adopted by the author and the research methodology used is based on the methodology of previous post occupancy evaluation studies.

In this research, the model is divided into three main parts: the first deals with the theoretical framework which consist of three sub-sections; the context of Libya, the phenomenon of dwelling alteration, and POE as an investigative approach. The second part includes the description of the methodology and data collection techniques, and the third, includes the interpretations of the data collected and the research recommendations.

Data collection

The methodology adapted in this research is neither quantitative nor qualitative. It is a mix of these two approaches. The techniques used for data collection are a questionnaire, checklist, and physical measurement as well as photographs. The questionnaire is divided into five main sections:

Housing experience. This investigates the physical attributes of the previous and current house, for example, the number of spaces in the dwelling, how the owner evaluates these spaces, doors and windows, comfort during summer and winter and features disliked in the previous and current dwelling. In addition, some questions relate to the type of dwelling and the owner of the dwelling.

Ideal home. This is based on the premise that residents alter their dwelling to meet their needs. To fulfil their needs, it follows that they have an ideal image of the dwelling.

Satisfaction. This section is divided into two parts, the first part covers satisfaction with architectural space and explores four sub-themes: satisfaction with the area of the elements within the dwelling, satisfaction with the position of the elements to each other, satisfaction with the activity within each space and satisfaction with privacy. The second part covers satisfaction with the neighbourhood, lighting and attributes such as appearance, social life and facilities.

The fourth section of the questionnaire, examines the alterations carried out by the owners and how the residents evaluate these changes from the point of view of their cost and importance.

Finally, demographic information reviews the householder characteristics, his/her family, their income, education and family size.

The second data collection technique used in this research is the observation checklist as an environmental assessment tool. This checklist includes six cards (see Chapter Five). In this checklist, physical measurements carried out on altered dwellings are compared with the original dwelling design.

Data analysis

The questionnaire includes closed and open questions. A SPSS software package was used to analyse the data elicited from the closed questions' software package and to analyse these questions. For the open-ended questions, piling techniques were used to analysis these type of questions.

Because the research is oriented towards domestic space, therefore, space syntax was used to analyse that space. The analysis includes a comparison of spaces in the original plan and the spaces of the same dwelling after alteration.

Research outline

This research is divided into three main parts. The first part (initiation phase) includes the theoretical framework and description of the context of Libya, the phenomenon of dwelling alteration, and POE. The second part (planning phase) includes the research design and methodology, data collection techniques and data analysis. The third part (understanding phase) includes three chapters discussing the results which are introduced in Chapter Six in more depth. These three parts contain nine chapters, with an introduction and recommendations, as shown in Figure 2 below.

Chapter One: The context of Libya. In order to understand and evaluate the domestic space in Libyan public houses, and before dealing with the empirical investigation, the author firstly explains the context of Libyan society and the Tripoli region from the point of view of location, climate, socio-economic circumstances and traditional and modern domestic spaces (houses). This chapter establishes that Libyan society and its architecture is in transition and this can be recognised from the nature of the government plans, social life and land uses, as compared to those of the past.

Chapter Two: The phenomenon. From the previous chapter, it becomes clear that, to evaluate a building or a project, inquiry must centre on a specific concern. In this thesis, this concern is the phenomenon of alterations within public housing in Libya. Because this alteration has generated very little discussion in Libya, Chapter Two considers what has been written about it internationally. This literature review establishes that the phenomenon of alterations and additions to domestic space is well researched in the industrialised world but is still not fully understood in the third world, especially in a country like Libya. Many models have been proposed to investigate this phenomenon, and these take their perspectives from many various disciplines (economic, social and environmental) and study some factors related to the alteration phenomenon.

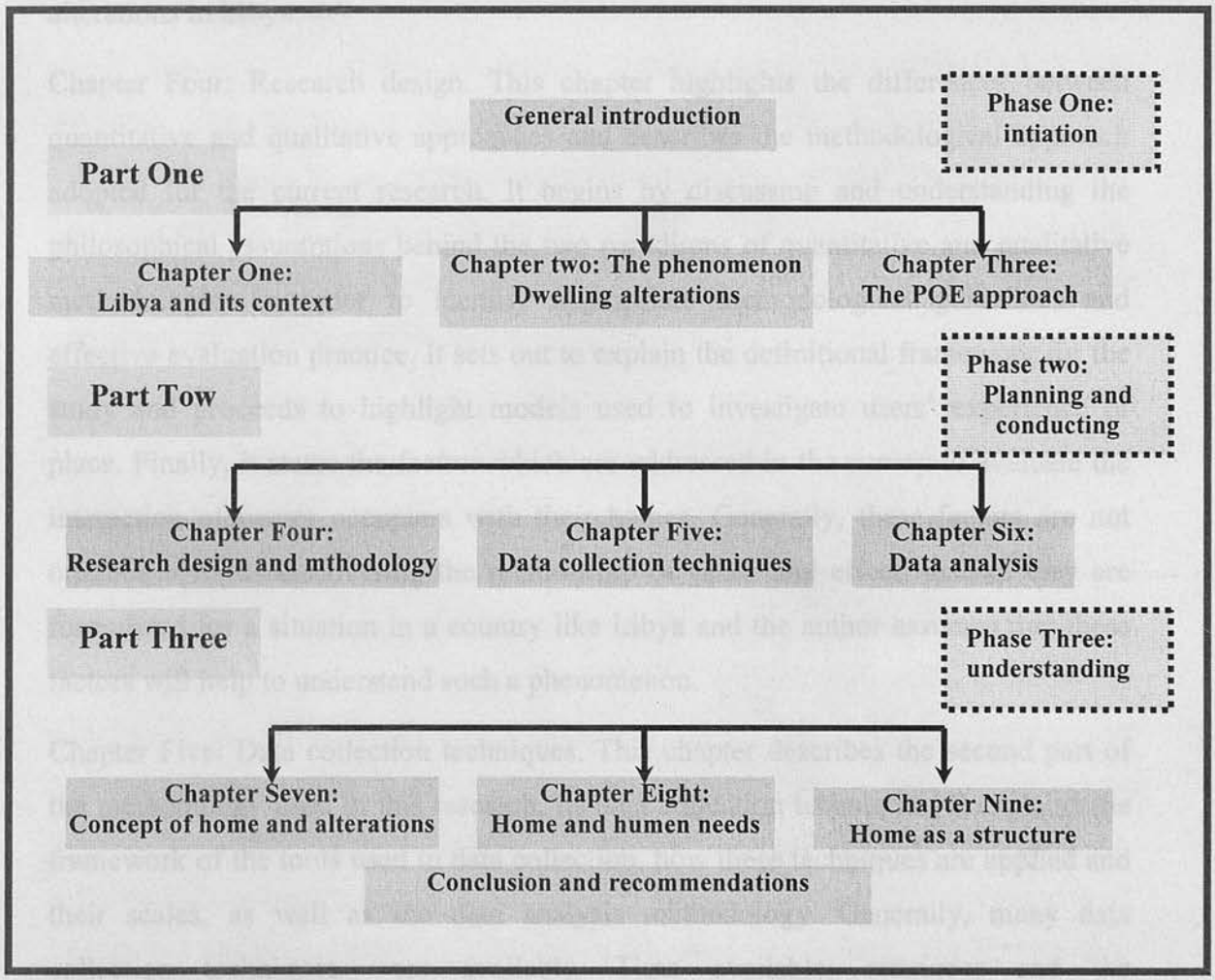


Figure 2 Thesis structure

Each of these approaches is designed to benefit a particular research agenda within a particular context. Generally speaking, however, housing alterations in industrialised

countries are brought about by factors different from those that affect the household in developing countries. Chapter Two concludes that research on housing alterations in Tripoli region needs to adopt an approach that recognises cultural and subjective issues as the main dimensions behind the phenomenon.

Chapter Three: The approach. This chapter considers post occupancy evaluation (POE) within the broader context and outlines various trends and significant definitions and models that have been adopted to investigate the built environment. In addition, it includes an overview of POE history, charts its development of the initial research project and explains the differences between POE and architectural criticism. The aim of this chapter is to refine the author's knowledge of POE and to prepare a framework for building a model to investigate the phenomenon of dwelling alterations in Libya.

Chapter Four: Research design. This chapter highlights the differences between quantitative and qualitative approaches and describes the methodological approach adopted for the current research. It begins by discussing and understanding the philosophical assumptions behind the two paradigms of quantitative and qualitative methodologies in order to identify appropriate methodological guidelines and effective evaluation practice. It sets out to explain the definitional framework for the study and proceeds to highlight models used to investigate users' experience of place. Finally, it states the factors which are addressed in the survey to evaluate the interaction of owner occupiers with their homes. Generally, these factors are not oriented towards discovering the relationship of cause and effect, instead they are formulated for a situation in a country like Libya and the author assumes that these factors will help to understand such a phenomenon.

Chapter Five: Data collection techniques. This chapter describes the second part of the methodology used in this research, its data collection techniques. It explains the framework of the tools used in data collection, how these techniques are applied and their scales, as well as the data analysis methodology. Generally, many data collection techniques were available. Time available; resources and the circumstances of the subject under investigation are all issues that affected the type of techniques that were used in the research. Experiment and observation were excluded, from the research methodology, for example, in the context of people's homes, any experiment would not have been practical and observation would not

have been appropriate because most of the alterations had been made a long time ago. The data collection relied on a questionnaire, a checklist of alterations, photographs and physical measurements.

Chapter Six: Data analysis. The data collected in the main study was coded, built into computer files and presented in several ways. Firstly, a one-way tabulation was used to study the frequencies and percentage distribution of the responses, as a descriptive statistic. This process is generally useful in presenting data in a simplified way that can be understood by non-researchers. Secondly, the author used factor analysis, as stated by Field, (2000), through which the existence of clusters of large-correlation coefficients between subsets of variables could be viewed to measure aspects of the same underlying dimensions, known as factors. The purpose of factor analysis is to reduce a large data set into a smaller subset of measurement variables. In other words, this process also aims to simplify data and bring relevant findings to the forefront. This chapter is divided into three parts. The first part includes a questionnaire analysis, the second part includes space syntax analysis, a comparison has been carried out between the original plan and altered plan. The third part, presents a discussion of the major dimensions which can be elicited from the survey into alterations and the reasons for them.

Chapter Seven: Concept of home and alteration. The survey and analysis of the previous chapter suggested a field of discussion that was indicated but not completely explained, by the alterations people had made to their homes. In other words, the post occupancy evaluation provided a range of observations that led to a more theoretical discourse, and to identify what 'the home' signified to its users. The chapter opens by examining the 'concept of the home', firstly, by offering an overall definition of the term, then by investigating components identified in the literature as being relevant to it. This builds up a user-oriented understanding, yet the tendency in Libya is for the designer, not the user, to determine the home form and plan. This gap between the designer and user is discussed as a way to explain the phenomenon of widespread home alterations as observed in the previous chapters. The chapter then looks further in to the underlying nature of alterations, creating these within two categories, as process and result.

Chapter Eight: Home and human needs. Post occupancy evaluation researchers almost always finish their researches when they complete the data analysis and

submit the data report. Seldom do they take a further step to formulate their findings within a theoretical framework. This chapter attempts to locate the results generalised in the previous two chapters into a broader theoretical context. The intention is to use the findings as a route to understanding the notion of home. Despite a growing literature on the meaning of home, the complexity is, as yet, little understood (Sixsmith, 1986). The main theory introduced in this chapter is motivation and personality

Chapter Nine: Home as a structure. Home is more than a dwelling. It is enriched with deep social, cultural and historical significance. The objective of this chapter is to introduce the concepts and theories which can be used to investigate and understand the home, to go deeper in to its broad meaning and to establish a perspective useful to those who will undertake to produce homes integrated to residents' needs. To this end, structuralism is employed as a method to explain and seek laws that guide almost any complex phenomenon that can bridge the physical realm and its underlying principles. In this way, the author hopes to offer a new means of thinking conceptually about the home. He was driven by the richness of the empirical work, as well as by being conscious of the difficulties of adapting previous models for studying the dwelling alterations phenomenon and the complexity of the concept of the home and its interrelated elements. This is highlighted in the research. Unless decision makers, and professionals consider such values, owners will need to change their dwellings to satisfy their own concept of the home. The research objective is to rethink dwellings, to recognise them from the inside, not outside, such that the decision-maker's concept of house is brought closer to the owner's concept of home.

The findings of the research emerge from both its theoretical and empirical aspects and many dimensions have emerged, for example, the dwelling alterations phenomenon in Libya should be considered as a process of transforming dwellings into homes, given that the reasons for carrying out such alterations are privacy, personalisation and security.

Research limitations

There are a few minor limitations to the study as follows:

- The data collected represents a group (house owners) associated with a single building type, from three different neighbourhoods, which means that it is not easy to generalise from the findings of this research to other studies.
- It is not the aim of this research to prove or disprove any hypothesis. Instead, it aims to obtain information about a phenomenon in the built environment and, by analysing the results of the inquiry, to suggest hypotheses that might become the basis for further investigations.
- The types of dwelling under study were single-storey buildings. Alterations that have taken place in high-rise buildings have not been considered in the current study.
- It was noted that during the survey, six respondents added new areas to the front yards of their dwellings. This activity is illegal and they never mentioned it, nor why they carried out such an activity. They started by constructing a metal fence around the area, then they planted trees and, after some time, they built a new wall after demolishing the earlier fence.

Introduction to Part One

Each study has a point of departure, for this research it is '**Part One**' which is divided into three chapters, as explained in the general introduction. Considering this part under POE umbrella, then it will be classified as an '**initiation phase**' which aims to highlight three main concepts. The first one, the context of Libya from the historical, economical, social and housing background. The second theme is dealing with the phenomenon of dwelling alterations. The third theme is concerned with the approach itself, discussing its roots, importance and other issues related to POE as a discipline.

Chapter One
Libya and its Context

1.0 Introduction

Housing was and still is one of the major concerns of the Libyan revolutionary government from its inception in 1996, and the provision of adequate housing for all Libyans from the 1980s has remained a top priority. Wide-ranging initiatives have been tried out in the country and in the capital city of Tripoli in particular. In retrospect, these projects have proved expensive and have created many problems on the personal level and on the level of the built environment. One widespread phenomenon, from the author's experience and knowledge of the new housing in Tripoli region is that many residents have put many resources, in term of time, effort and expense, into reshaping dwellings provided by the government.

Rapoport (2000) describes the environmental quality of housing as a set of attributes, obtained by dismantling and which can be represented as a profile. Housing choice reflects a particular system of variables, that are greatly associated with environmental quality. The objectives of this chapter are to briefly set out the historical, geographical, economic and social context for the development of housing in Libya. In addition, this chapter focuses on a study of the Libyan housing pattern and socio-cultural needs that existed in Tripoli region in the traditional period before the country was influenced by western architecture and industrial technology. The reason for selecting this period is to determine the historical and traditional forces that people expressed in their dwellings. That means investigating the way in which religion, security, customs and household privacy were reflected in social organisation and the dwelling spaces of Tripoli region. Because much of the physical character of these spaces, which itself embraces their meaning and purpose, is communicated though a range of interior and exterior component, details and characteristics of these traditional and contemporary dwellings are also studied.

Discussion of these variables that are related to the housing profile in Libya is intended to guide the author to an understanding of which variables could be considered as pushing factors for Libyan citizens to alter and modify their homes. The factors examined include family income, family size, urban land supply and environmental and cultural forces.

In describing Libyan house patterns, the research does not aim to give details of the Libyan house evolution, or study the genotype of Libyan dwellings. Rather, the aim is

to understand the typical structure of the traditional Libyan domestic space, the arrangement of this space in traditional architecture and the possibilities it offers for spatial alterations, and then to compare it with the modern dwelling prototypes.

1.1 Location and physical setting of Tripoli region

Libya is an Arabic state, located in northern part of Africa (Figure 1:1). The country is characterised by four major ecological regions, each of which contains a series of discrete microenvironments. The north-western zone (Tripolitania) extends from the south and south-east of Tunisia in the west, to the Gulf of Syrt in the middle of the country in the east. The north boundary of the region is the Mediterranean Sea and the south is bounded by the Fezzan region.

Tripoli region consist of four sub-regions. According to the categorisation of the Ministry of Planning (1989), they are: Tripoli sub-region, Zawiah sub-region, Garian-sub region and Khomuse sub-region (Figure1:2) However, these four regions can be divided into three major zones: the coastal zone, Gafara plain and the Gable (mountain) area. The coastal zone and Gafara plain spread across southern Tripoli towards the coast and vary in width from 20 to 80 kilometres.

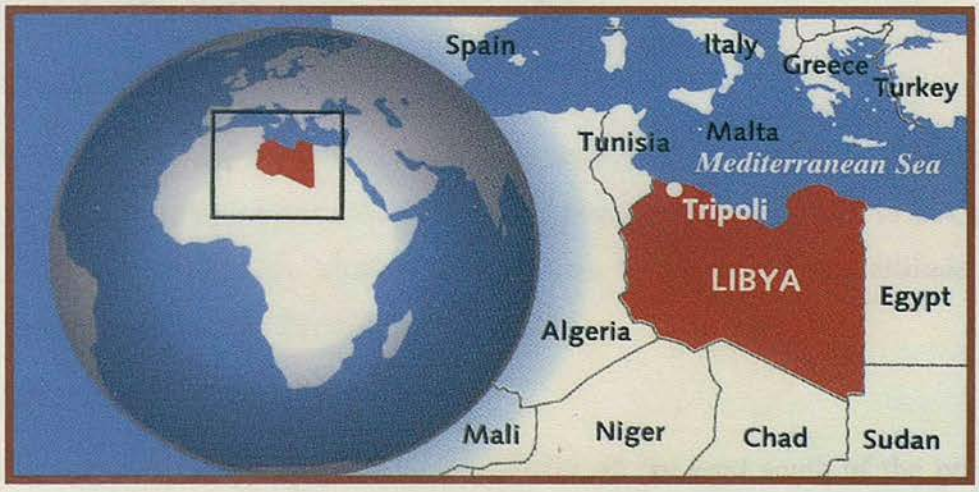


Figure 1: 1 Location of Libya
(Source: Ham, 2002:7)

1.2 Climatic and environmental forces

In Libya, as in other North African countries, the characteristic climatic environment is extremely unstable because of the two conflicting influences of the sea and the desert. Furthermore, changeable climatic conditions can be observed more frequently and

extremely in the western region of Tripoltania than Cyrenaica (Daza, 1982). From a climatic point of view, scholars divide Tripoli region into four zones (Ministry of Education, 1982: Arabic), the coastal zone, the steppe plain zone, the mountain zone and the desert zone.

1.2.1 The Coastal zone

This climatic sector is a narrow strip stretching from the western to the eastern border of Tripoli region, bordering the southern shore of the Mediterranean Sea. The weather of this strip, which varies in width from 20 to 80 kilometres, varies according to the topographical variation of the land generally. It is similar to most of the coastal areas of northern Africa and southern Italy. These similarities can be observed in the average temperature, seasonal rainfall, and the influence at all times of the north quadrant wind (NW to NE), which brings some humidity and moisture to the atmosphere.

1.2.2 The Gafara plain climatic zone

The second zone located in Tripoltania region is the Gafara plain, which lies directly south of the coastal zone and ends in the western mountains. This zone is characterised by its higher annual and seasonal temperature. Seasonal precipitation is less in quantity and duration than in the coastal zone, and the predominant wind direction in this zone is northern in the winter and southern in the summer.

1.2.3 The mountain climatic zone

The mountains in Tripoli region extend from west to east. This zone geographically starts south of Tunisia, enters Libya under the name of Gebel Nufusa or al-Gebel el-Garbe. The general climatic character of this area is affected by the altitude and its position and distance from the seashore.

1.2.4 The desert climatic zone

This climatic zone, which is the largest, includes all the land south of the previously named zones. This zone has an average annual temperature much higher than the other zones. Rainfall is almost zero, and sandy storms from the south and east are frequent.

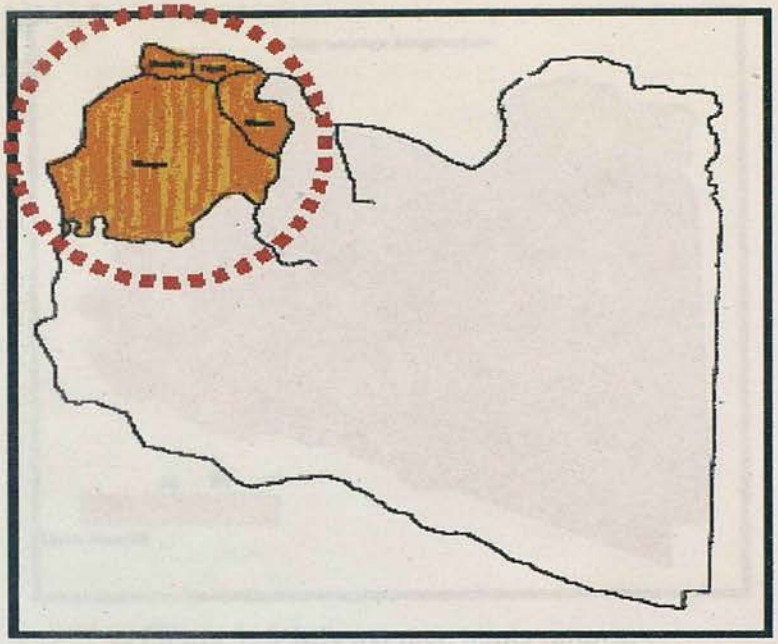


Figure 1: 2 Location of Tripoli region (source: the author)

1.2.5 Temperature

The costal cities and villages in Tripoli region have an annual average temperature of around 20°C (Figures 1:3). This average temperature reflects the hot summer season; winter is not very cold in the coastal zone. Its absolute minimum does not approach the freezing point. The coldest month in this zone is January, which has a mean maximum of 17.2°C and a winter minimum of 3.2°c. In the Gafara plain climatic zone the annual average temperature rises gradually in relation to its inland distance until it reaches 24°c at the meridian line (Doxiadis, 1964). The western mountain in Tripoli region forms the mountain climatic zone. Its cities and villages are affected by their altitude and their distance from the sea, which makes the mean temperature in winter time differ by 5°C from that of the coastal area. The desert experiences large temperature differences between day and night. Generally speaking, there is some deficiency of heat in winter and excessive heat in the summer, especially in the coastal and mountain climatic zones (Daza, 1982).

1.2.6 Rainfall

The annual rainfall in the coastal and mountain zones of Tripoli region is relatively small. The maximum is four hundred millimetres (Figure, 1:4). This is limited to a few cities such as Tripoli, Homes, Garian and Zawia. The wettest months are December and January.

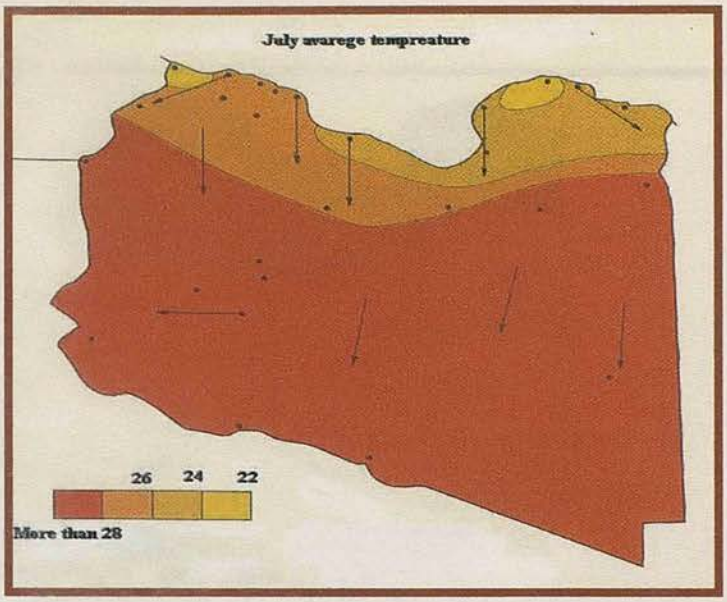


Figure 1: 3 July average temperatures.
(Source: Libyan Atlas, 1985:43)

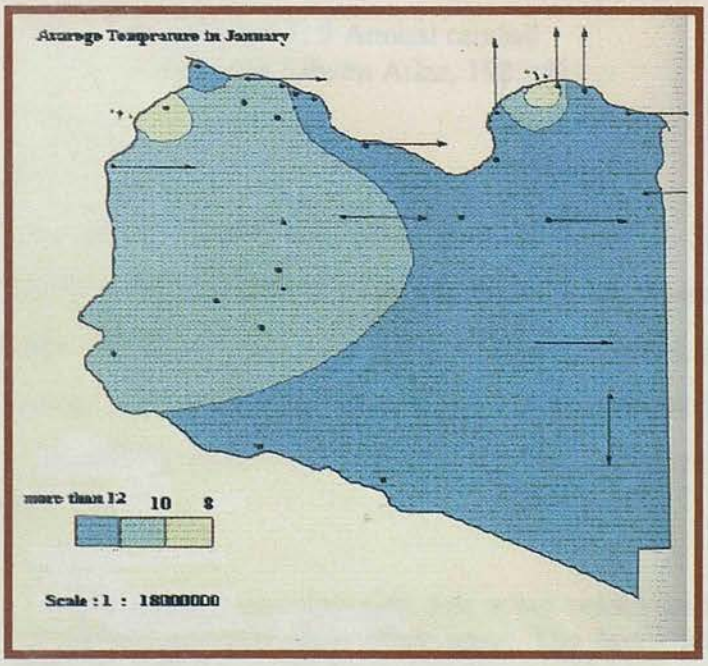


Figure 1: 4 Annual temperature January.
(Source: Libyan Atlas, 1985:43)

Another characteristic of the rainfall in most of the region of Libya is that it occurs only during half of the year in the coastal region (October to March), and in most of the region its duration is often shortened to four, or sometimes even to three or two months. The amount of rainfall varies from one month to another and is extremely irregular.

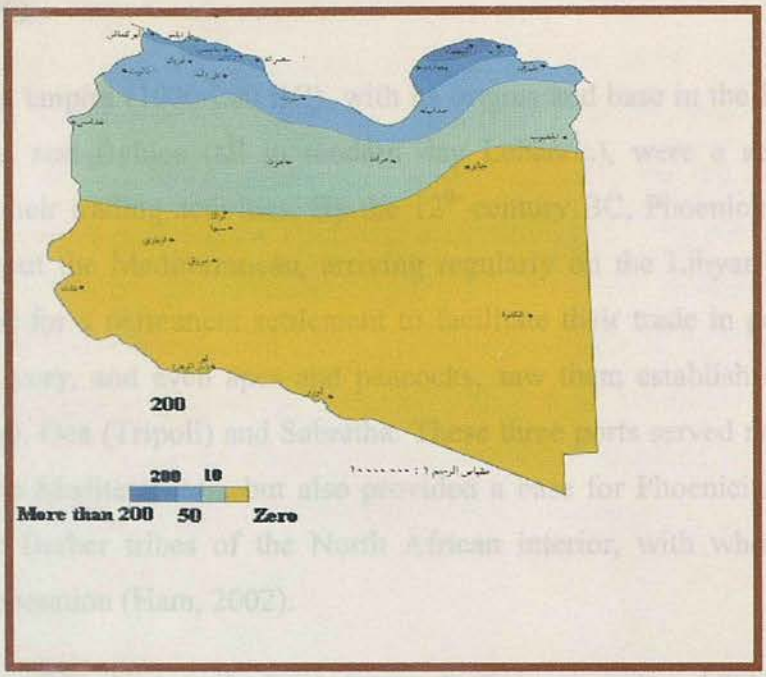


Figure 1: 5 Annual rainfall
(Source: Libyan Atlas, 1985:43)

1.2.7 Wind

The dominant winds on the coastal zone blow from the north. In the hinterland area (Jefara), the prevailing wind direction is more enclosed. In the western mountain area the prevailing winter winds are from the west; during the other seasons the wind direction varies widely, although the prevailing wind comes from the south meridian .In the desert zone the prevailing wind is mainly from the east and the south. In the words of Aburawi (1984):

> "In the desert wind direction and wind velocities are more frequently perverse than other wise. The hot Ghibli wind finds full freedom whenever it blows, this wind lasts for some days, is loaded with suffocating sand that makes the air seem like an open oven and turn the atmosphere in the desert zone reddish" (Aburawi, 1984: p.42).

1.3 Historical background

The history of Libya, especially Tripoli, has witnessed many different occupations. The city has been dominated by many different nations: Phoenicians, Carthaginians, Romans, Arabs, Spanish, Ottomans and more recently by the Italians until the twentieth century, when Libya achieved independence. During these periods the city of Tripoli

was both positively and negatively affected by waves of destruction and development (Shawesh, 2000).

The Phoenician empire (1000-200 BC), with its origins and base in the Levantine ports of Tyre, Sidon and Byblos (all in modern day Lebanon), were a seafaring people renowned for their trading activities. By the 12th century BC, Phoenician traders were active throughout the Mediterranean, arriving regularly on the Libyan coast by 1000 BC. Their need for a permanent settlement to facilitate their trade in gold, silver, raw materials and ivory, and even apes and peacocks, saw them establish the colonies of Lebdah (Leptis), Oea (Tripoli) and Sabratha. These three ports served not only trade to the north of the Mediterranean, but also provided a base for Phoenician merchants to trade with the Berber tribes of the North African interior, with whom they signed treaties of co-operation (Ham, 2002).

After the purge of Carthage in the Punic Wars, the Romans assigned Tripoltania to their ally, the Berber king of Numidia. In 46 BC, Julius Caesar deposed the final Numidian king. The year that followed was one of Libya's finest (El-Barghoty, 1971: Arabic).

The most significant cultural and historical changes occurred when the Muslim Arabs, led by Omar Ibn-al-As, conquered Libya in 642 AD (Warfelli, 1976). They brought with them their religion, language and culture as well as their architecture Wright (1969: 79) points out that:

> "The Arabs had brought with them little more than their religion, their language, and their influence on the people... offering a faith and with it a social system and culture, that they completely absorbed".

Within a century Islam established roots throughout all the country and had been accepted in all villages and cities.

From 1551, until the beginning of the twentieth century Libya was a province of the rising Ottoman Empire, which had emerged as the principle power in the Middle East and Mediterranean area. In October 1911, Italian troops invaded the Libyan coast and from 1912 to 1943 Libya was under Italian colonial rule. What is notable in this period, as stated by Abubaker (1996), was that new construction and transportation industries were introduced to serve the needs of the coloniser.

In October 1951 Libya was declared an independent state with its own federal monarchy, and named the United Kingdom of Libya. However, Libya was still effectively colonised by the Americans and British. In 1969 the monarchy was overthrown and the country became a free democratic Arab republic. In 1975 another step was taken, which changed the political system to overcome the bureaucracy that hindered direct access between the executive and the masses. This led to changing the name of the country to the Socialist People's Libyan Arab Jamahiriya. Figure 1:7 explains the new political system of Libya, which was introduced by Colonel Gadaffi in the Green Book. The system swept away all previous administrative structures and replaced them with a pyramid committee system. The lowest of these is the basic people's committee or congress, to which every citizen belongs.

1.4 Population

Many reasons pushed the Libyan population to decrease between 1900 and 1943, including the economic situation and the Italian colonisation of the country. In 1951, the year of independence, the population started to increase (Ministry of Planning, 1995). However, since the revolution of 1969, the population of Jamahiriya has increased rapidly and now has a growth rate of more than three per cent per annum which can be counted as one of the highest in the world. Many reasons underlie this rate of growth, but the significant reason for this can be attributed to the improvement in general health standards resulting in lower infant mortality rates. In 1984 the population reached 3,637,500, and in 1995 its population stood at 4,799.06 (Ministry of Planning, 1995).

1.4.1 Households

According to the 1973 census, the number of households in July 1973, was 386,048, compared to 331,990 in 1964, which means an increase of 54,058 households during 9 years. Aburawi (1982) points out that this increase is not in keeping with the increase in population. He argues that this phenomenon is possible due to the traditional cohesion between blood relations in the Libyan society which reduces the formation of new households. In the 1995 census the number of the households was 721,358, with an average growth rate of 2.41% (Ministry of Planning, 1995).

The 1973 census shows that the typical household then consisted of 5 to 6 individuals and about 12 percent of the households were made up of 8 or more members. The pattern is about the same as that reported in the 1984 census, where the average

household number was 6.82. In the 1995 census 18% of the households included 10 members and 60% of the households included 5 members.

Tripoli region has the largest population in the country. About 49.7% of the Libyan

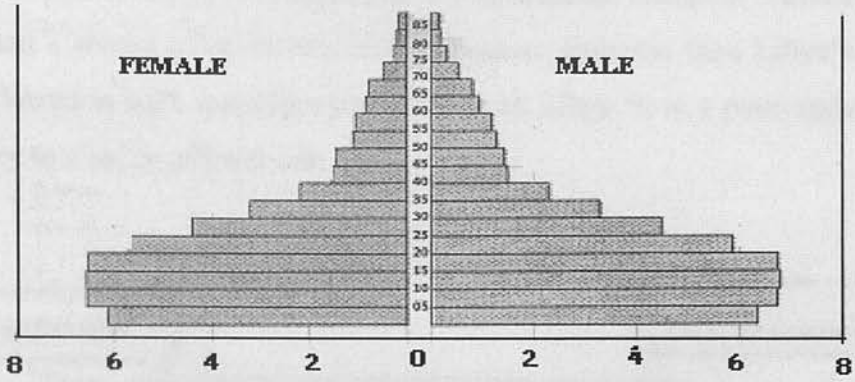


Figure 1: 6 Libyan demographic profile in 1995
(Source: Ministry of Planning 1995: 9)

population live there, with 1,311,761 living in Tripoli Metropolitan City in 1990 (Ministry of Planning, 1995). After 1956 immigration to Tripoli city started to increase. For example, in 1984, the total number of people recorded as migrating to Tripoli was 30,000, while in 1995 the total number was 7264 (Ministry of Planning, 1995). This was due to the oil boom and the availability of job opportunities. Generally after independence the Libyan economy faced a lack of resources and industry. The weak economy could not provide good education, health care, public facilities and housing. Many shanty towns were built around Tripoli City.

1.5 Economic development

Higgins stated that:

> ''Libya before oil was a prototype of a poor country ... the bulk of the people live on subsistence levels ... it had no sources of power and no mineral resources, where agricultural extension is severely limited by climate condition, where capital formation is zero or less, in addition there is no skilled labour supply and no indigenous entrepreneurship ... if Libya can be brought to a stage of substantial growth there is hope for every country in the world. Higgins (1953:17)

Higgins added that since the Libyan agriculture economy was restricted to less than ten percent of national territory, Libya had to depend on foreign aid, mainly from the United States and Britain. In 1953-1954 this aid reached US$ 26 million.

Within approximately 20 years from this report, the situation of the Libyan economy was quite different. Farley (1971) states that it was difficult, except in Kuwait and Saudi Arabia, to find a record of economic evolution more dramatic than Libya's. Within a decade, oil flowed in such quantities that it changed Libya from a poor agriculture and desert country to a super-affluent one

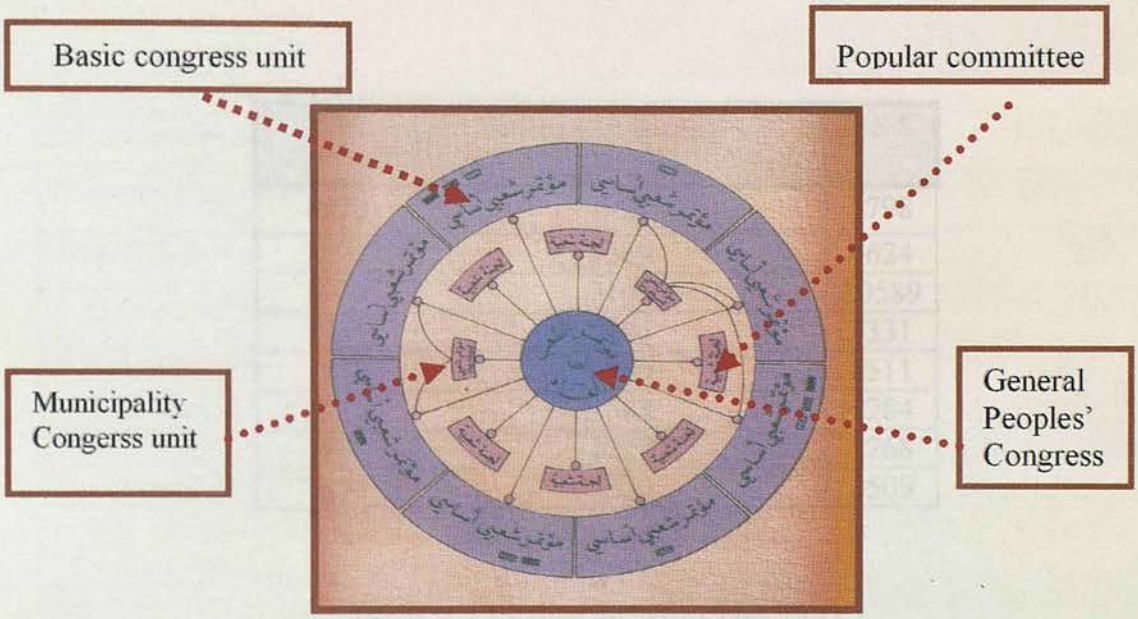


Figure 1: 7 The new political system had been established in 1975
(Source: Ministry of Foreign Affairs, 1976:18)

Ever since oil, development has produced profound effects on the country's economic outlook. This dramatic change has had adverse as well as beneficial effects on the Libyan economy. Since the discovery of oil, the economy has been based on oil exports and revenue. Oil exports represented 98 percent of total exports in 1964. The rapid growth of the oil sector accentuated the dualistic nature of the economy next to the traditional agricultural sector. Agriculture was adversely affected by the migration of the labour-force to the cities as well as by the transformation of farms into residential zones to meet the increasing demand for housing.

1.5.2 Income growth

One of the main indicators of a rise in living standards, especially in Libya after the discovery of oil, is real income per capita. This increased from 642 Dinars (US 1798) in 1970 to 2,586 (US 8,753) in 1982, representing an increase of 12.3 percent on the compound annual rate (Table 1:1). In addition, living standards are likely to continue rising over the next few years (Ganous *et al.*, 1994. Arabic).

This increase in per capita income had an effect on many factors of Libyan life. For example, most of the families were able to afford, and have purchased, television sets refrigerators, new furniture and so on. The author understands that this factor is one of

Year	Income per capita L. Dinars	US $
1970	642	1798
1975	1369	4624
1980	3166	10589
1985	2195	7331
1988	1650	5511
1990	1582	5284
1991	1727	5768
1993	1350	4509

Table 1: 1 Income growth 1970- 1993
(Source: Ganous *et al.*, 1994:34)

the main forces that have driven the people to make alterations to their dwelling space.

1.6 Housing in Libya

In 1964, according to the 1973 national census, about 44% of dwellings in Libya consisted of what the census department termed ''marginal housing units, tents and shacks''. The same source indicates a reduction of 27% in this category by 1984, few families lived in temporary dwellings. Especially after the revolution, thousands of houses were built by the government. Table 1:2 indicates the two main sectors that dealt with housing supply, the government and the private sector. The total number of units built and completed by the government during the period 1970-1980 were 108,804 units; on the other hand, only 184,492 units were under construction, by the private sector over the same time.

Table 1:2 shows clearly that the total units built between 1970 and 1988 by the private sector were more than those built by the government. Private sector construction was facilitated by a loan system established by the government in 1971, under which any person could secure a loan. This led the Central Bank of Libya to offer a loan system from 1971. The total amount of loans given from all banks in Libya was 2,077 million by 2003. According to the categorisation of the Central Bank (2004) four types of loans can be identified: middle class loans, low income loans, urban development loans and housing associations loans. These are defined as follows (Central Bank report, 2004):

	Completed units	Units under construction	Total
Housing built by government sectors			
1 Low income units	82,232	26,335	108,567
2 Agriculture units	13,857	1108	14,965
3 Complete cities and villages	4029	7910	11,1939
4 Investment units	7776	11,400	19,176
5 Public housing	1010	3511	4521
Total	108,904	50,264	159,168
Housing built by private sector			
Loans from commercial banks and investment banks	184,492	68,395	252,887
Total	293,396	118,659	412,055

Table 1: 2 Housing units constructed or under construction during the period 1970-1988 (Source: Ganous *et al,* 1994: 455)

- *Middle class loans*. The first loan amounts to middle class citizens was 6,500 LD, started in 1976. This amount rose to 14,000 LD and 30000 LD. In 1991 it decreased to 15000 LD.

- *Low income citizens loans.* This type of loan started in 1972 and was discontinued in 1983. Such loans were restricted to low income people with salaries of not more than 100 LD per month.

- *Urban development loans.* The Central Bank of Libya started to offer such loans through other commercial Libyan banks at the end of 1972 and stopped them in 1975. The aim of such loans was to enhance urban areas in all Libyan villages and cities by building high-rise housing units. The total amount was 97.7 million LD.

- *Housing association loans.* According to the government policy of reducing the shortage of housing, many housing associations were established in each district. From 1975 until 1987 the total amount paid was 580.2 million. All these loans were given through the Libyan commercial banks (Central Bank report, 2004)

For many reasons, and especially in terms of urban development loans, the housing market came to be controlled by a small number of landlords. This outcome was the opposite of the intentions of the loans programme, an initiative designed to deliver the revolutionary leader, Gadafi's philosophy that:

> ''Man's freedom is lacking if somebody else controls what he needs. For instance, the house is individual and family basic need, consequently, it should not be owned by others. No freedom for a man who lives in another's house, whether he pay rent or not'' Qadafi (1976: 10).

There were attempts to translate this into a housing policy. For example, in March 1981, Law 4 was introduced. This ruled that every family in Libya had the right to own their house, though no person could own more than one house, with the exception of widows whose only income was rent. Committees were set up in every municipality to carry out this resolution. And they oversaw the complete redistribution of apartments and houses owned by private companies and government bodies in all municipalities by 1984 (Secretariat of Housing, 1985). An almost immediate consequence of Law 4 was that the private rental housing market, the one sector best equipped to absorb immigrants into the country, virtually disappeared while the population continued to increase.

In 1989, according to the study undertaken by the Ministry of Housing on future housing needs, 50,000 units needed to be built per year to meet demand (see Table 1:3).

The region	No. of Units	%	Dwellings/ per a year
Tripoli	469,000	61	30,500
Benghazi	208,000	27	13,500
Elkhaliji	51,000	6.5	3300
Sabha	41,000	5.5	2700
Total	769,000	100	5000

Table 1: 3 Estimated housing needs 1985-2000
(Source: Ministry of Planning:19)

The government failed to complete this plan for many reasons, for instance, cancellation of the Secretariat of Housing, which meant the transfer of all housing matters to the

municipalities, most of which were already suffering from financial deficit to complete and build the housing units needed in their area. The only government administration which continued to build and offer loans for housing was the Estate Investment Bank (Central Bank report, 2004).

A detailed appraisal of the effects of this policy on housing demand, provision and ownership is a rich topic for future research. This study, however, only provides an overview of the policy, seeing it as a significant factor in accelerating the rush to rapid and low-cost answers to a massive demand for housing. In other words, while Law 4 helped to fuel the real need for a housing typology that could be constructed at a minimum expense and in great numbers, it is the typology itself that is the focus of this research. Nevertheless, several observations have been made about the deficiencies in the government housing programmes. Essayed (1982) states that most public housing schemes were designed before the sites were decided and without any system of feedback about type, size and suitability of dwelling units, design approaches, local circumstances, site implications and local requirements. Such projects showed a complete misunderstanding of social and environmental aspects of housing. Abubaker (1996) adds that architects had ignored the users' socio-cultural values by importing western patterns that were inappropriate for a Muslim society like Libya. In the same survey, Abubaker declares that the causes of the negative effects can be related to the design process. Decision-making about the design and site planning of these public housing projects was extremely centralised and was limited to a single person's decision with insufficient opportunity for criticism and team work.

1.7 The market

In this section, the researcher describes briefly the contemporary market situation in Libya. Generally the housing market in developing countries can be divided into 3 sub-markets, they are the commercial, the governmental and squatters' (Lechuga, 1977). Few studies have investigated the circumstances and variables of the local market but it is well known that the sources of financing, production, timing and control of housing construction in the squatters' sub-market differ significantly from those in the two other institutionalised sub-markets. In the government sub-market, the building process is entirely in the hands of specialised labour, whether in the design stage, programming, or construction phase. The International Bank for Reconstruction and Development (1960: 41) indicated that:

> "As a result, through no fault of its own, Libya has remained heavily dependent on foreign administration and technical, personal, and training of the Libyans to replace them is still the most difficult of all the problems associated with economic development" (International Bank for Reconstruction and Development, 1960: 41)

Generally the qualities of commercial activities, in law and management, changed little between 1954 and 1969. Any transformation seemed to be after the revolution (Shawesh, 2000).

Under such circumstances the new regime relied on British expertise for large-scale architectural and planning works. For example, in 1973 Colin Buchnan and Partners were appointed as consultants to the National Housing Corporation which has influenced the housing situation in Libya (Kultermann, www.archnet. org).

Besides architects from England, Italian, Finnish and Japanese architects have also been invited to contribute to new projects within Libya. In comparison, the contribution by Libyan architects remained insignificant. This can be related to two main reasons: the shortage of professionals and the lack of good academic institutions. In response to this situation, the government established many universities and higher education institutions, for example, El-Fatah University; and the University of Garyounis in Benghazi, which commissioned the English architect James Cubitt in 1966 (most of this work was completed by 1981) (Kultermann, www.archnet. org), and many other institutions over the country.

1.8 Residential land supply

Land as a term suggests different things to different people (Araby, 2003). In this research, urban land is defined as that land which is utilised for uses other than agriculture and characterised by its connection to infrastructure, transportation and urban facilities. However, access to land for housing is problematic in African countries (Kironde, 2000).

The author is unaware of any comprehensive study into the land market in Libya, although he identifies that these are needed. The government-promoted schemes for rapid and continual urbanisation have been accompanied by a failure on the part of the municipal authorities to provide urban land in sufficient quantities. Following on from Araby's (2003) definition cited above, urbanisation requires not just vacant land but where a range of facilities are available.

Generally, five main policy instruments affect the supply of land. These are: property rights, land titling and registration, land use regulation, direct public intervention including land purchase, and use of physical power (Kironde. 2000). In the case of Tripoli region, property rights might be the main reason for the shortage of urban land. Most of the lands in the countryside's suburbs area are owned by tribes.

1.8.1 Private sector land

Generally speaking, every tribe used to occupy land with separate settlements. Residents of every settlement belonged to a kin-group of a sub tribe of the mother tribe. They shared agricultural and rural land. Each tribe in this traditional society considered land to be more than an economic resource; their relationship to land was intimately associated with issues of their personal, historical and tribal affiliations, in a way that evolved organically over many generations. They outlined their respective territories at the settlement, and the regional level; boundaries were drawn between tribes or bands of a mother tribe within which all members of the tribe or sub tribe had a common legal right to land for agriculture. Boundaries were not always constant, due to conflict and tribal problems. Ownership of tribal land was determined by a system of inheritance based on Islamic Shariah law. Within 20 years of the discovery of oil, these predominantly agricultural, tribal communities were transformed from a traditional model into communities in which every household subsisted directly or indirectly on government jobs. This had led most tribes to change their attitudes towards the land value in a way that also changed their housing priorities.

After the revaluation, many agricultural lands came to be owned by government authorities, mainly the Ministry of Agriculture and the municipalities. In 1972 an act was issued organising urban development. The purpose was to prevent speculation in land prices within the urban areas, prices being fixed on 1964 values plus 5% increase per year thereafter. The act facilitated the provision of lands to land owners to prepare and subdivide their land for development. The act also imposed a yearly tax on open land of 2.5% of its value for any area in excess 1600 m^2 per owner (Essayed, 1982).

1.8.2 Public land

In 1974 the Council of Ministries issued a set of regulations organising the sale of publicly owned land within the urban areas. The prices were determined within the limits of the market price and in conformity with urban development in each locality (the prevailing prices being those in the nearest urban centre). A set of priorities for

deciding between possible buyers was included in the regulations, as well as the system of payment. The buyer had to pay the total cost of land if it did not exceed 1000 LD by monthly instalments of not less than LD 10, and for not more than three years (Ministry of Planning, 1995).

Two sectors were considered as responsible for any buying process: the government Property Administration Office and the Town Planning Administration. The former was oriented towards financial matters. While the latter, a central government authority was considered to be the primary agency for supervising all schemes of urban land. It was largely ineffective, and a cause of many distortions in land transaction and investment decision (Essayed, 1982). As a result, unplanned settlements developed. Since 1969 only 197 land schemes were approved as urban settlement (Zedan, 2003), and yet there were many other settlements which grew rapidly without official authorisation. Because of the limitation of the land control by the Town Planning Administration, many private subdivisions were found in the local land market in Tripoli region.

1.9 Socio-cultural environment

After the introduction of Islam, Libya was considered as one nation and one culture. One of the strongest links joining the people together is the Islamic religion. The Muslim social life is based on the ancient traditions and teaching of the Quran, which holds that the individual is responsible to the family, and the family to the tribe or community (Abubaker, 1996).

In an Islamic society, it is normal within any group that the older persons have the greatest influence and respect, and that the individual is obligated to relatives and kinsmen. It is also common for grandparents and their children to live together in the same dwelling unit. This binds families together into units that share happiness and sorrow, face the events and accidents of life and learn from the experience of older and younger generations (Abubaker, 1996). Libyan society is mostly conservative, compared with modern western life. The separation of the sexes, privacy and social security are still important characteristics of Libyan people. The most salient aspects of the community, and to some extent of the society as a whole, are:

- The community in Libyan society was characterised by its hierarchical order. The family is the highest, then the clan, then the neighbours and finally the tribe or the community.

- The strongest relations and the acceptance of certain common values and authority are found in the family. Generally, going from the family to the whole community, the strength of the relations decreases and they become less conservative and more open.

- All the relations take place at parallel levels without overlapping or mingling among the members of the community according to their status, sex, age, position and so forth.

- Family life is different inside and outside the house. Inside the house relations between the members of the family are rigid and hierarchical, with immense power held by the father and the first son, if he is old enough. It is a patriarchal structure, very religious and conservative. In spite of the family's use of modern household equipment (television and modern furniture) people are very suspicious of the modern way of life (Aburawi, 1984).

As the society started to accept some of the values of a consumer society, the community ties have started to decrease (especially in the big cities), leading to a more independent family formation and living. The traditional organisation of Libyan society with its strong family ties still exists now to some extent.

1.9.1 Changes in the social relations

Ibrahim (1978) reports that the relations within the family and between the sexes, along with all other aspects of Libyan life, had already begun to show sudden and notable change. The interaction with the foreign settlers and the opening up to the West has increased social mobility, and the oil wealth and development plans of the revolutionary government have made many new kinds of employment available. Especially among the educated young, a growing sense of individualism has appeared. Many of these educated young people prefer to set up their own household at marriage. This individual life did affect in one way or another family ties in Libyan society.

Aburawi (1984) suggests that increased educational opportunities, especially for women, have produced individual and social contexts requiring a readjustment of accepted values and institutions. The result of women going out to practical life, for example, has led to an increase in the labour force and in household income while, on the other hand weakening the family ties. In brief, Libyan society is going through a transitional period.

1.9.2 Typical daily family life

Most Libyan families rise between 6 am and 7 am breakfast is the least important meal and usually consists only of a hot drink of tea, coffee and/or milk with a piece of bread

or traditional cake. If only the men of the family are wage-earners, after they have left the house, women spend a considerable time on housework. Apart from the major weekly and seasonal cleaning, a great deal of tidying and house cleaning is done daily: hanging out bedding, sweeping and washing down the entire floor area, outdoor terraces and yards. Some shopping may be done at local shops usually by the children but the main daily shopping is brought home by the adults on their way back from work (Essayed, 1982).

The men of the family usually return home from about 2 pm onwards, by which time the main hot meal is ready, the previous two or three hours having been spent in preparing it. An afternoon sleep is common among Libyan people after the heavy main meal and because of the climate. Most members of the household rest for a few hours, depending on the family programme for the rest of the day. If the men do not have to go back to work they conduct business or social obligations or sit in a coffee house which is a very popular as a social leisure facility. Visiting neighbours, friends and relatives is usually done from about 4 pm, returning home before the evening meal. However, visitors may stay for the evening meal or spend the night away from home, or even arrive in the morning and spend the whole day visiting other homes (Essayed, 1982).

An evening meal is usually served from between 8 and 10 pm. The family does not have to be together during this meal which is usually lighter and less formal than the main one but still takes a while to prepare. The rest of the evening is most likely spent watching television. Social events like wedding ceremonies, childbirth and the departure or arrival of visitors from abroad, normally conducted in the evening and night, are social obligations that the whole family should attend. Children usually do not have a bedtime routine and stay up as late as their parents which may be up to 11 pm or later (Essayed, 1982).

1.10 Libyan traditional and modern houses

Almost no city in Libya has remained intact in the face of the tremendous expansion of the urban population and the adaptation, on a large scale, of foreign urban forms and modern technology. The urban environment has changed rapidly, both physically and socio-culturally. The original Arab-Islamic urban forms of Tripoli, now found in what is left of the Medina, have been largely demolished or encircled by expanding urban areas, with housing and streets laid out according to the Western design patterns and a host of

new elements transplanted from Europe and other foreign countries on the grounds of modernism.

The settlements in Libya's western mountains had another form, the underground troglodyte houses that had been developed in the area centuries ago. Most of the troglodyte villages had no method of grouping their houses, and typically they were composed of a group of dugouts, their entrances leading out into the main pathway of the village. The dugouts were spaced at relatively large distances from each other in order to avoid the risk of earth walls collapsing. There were some better developed troglodyte villages in the area of Garian, which can be compared to the troglodyte village of Matmata in southern Tunisia, which shows greater regularity in dwelling disposition and pathway arrangements between them (Daza,1982).

The most significant differences between a dwelling in western culture and a traditional dwelling in an Islamic culture, such as Libya, reflect issues of socio-cultural needs, particularly privacy and religion, and can be seen in the separation of public and private life. This characteristic affected the use of space both within the city and the individual house.

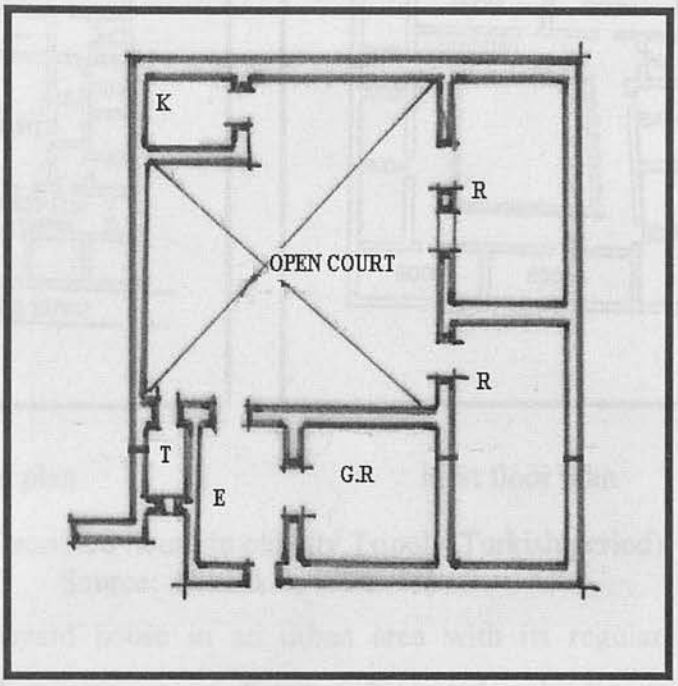
There are many different dwellings in Libya. Variations depended on the geographical, economic, socio cultural, climatic and historical forces that acted on the formation of the shelters. Many attempts have been made to categorise these Libyan house patterns (Shaiboub, 1979; Daza, 1982; Essayed 1982; Betru, 1996). Daza in 1984, for example, identified four kinds of traditional shelters in Tripoli region: tents, huts, walled courtyard dwellings and troglodyte dwellings. He adds that traditional shelter is a reflection of a morphological and climatic variation in different zones and the possible ways of life, nomadic or settled, in relation to the scarcity of water resources of the country, which determined the various economic activities on which they depended. Also, traditional shelters reflected the customs, social organisation and structure of the various groups of the population.

This section the three main categories: traditional houses (these are entirely over ground); underground houses; and compound houses courtyard houses. As mentioned before the aim is not an attempt to study the genotypes of the Libyan house but to introduce these houses in terms of domestic space and its use, such that these patterns of traditional occupancy can be later compared to those offered in more recent dwelling

spaces.

1.10.1 Traditional walled houses

One of the most common types of traditional dwellings in Tripoli region was courtyard houses which spread in all areas of North Africa as well and particularly in the coastal area (Figure 1:8).



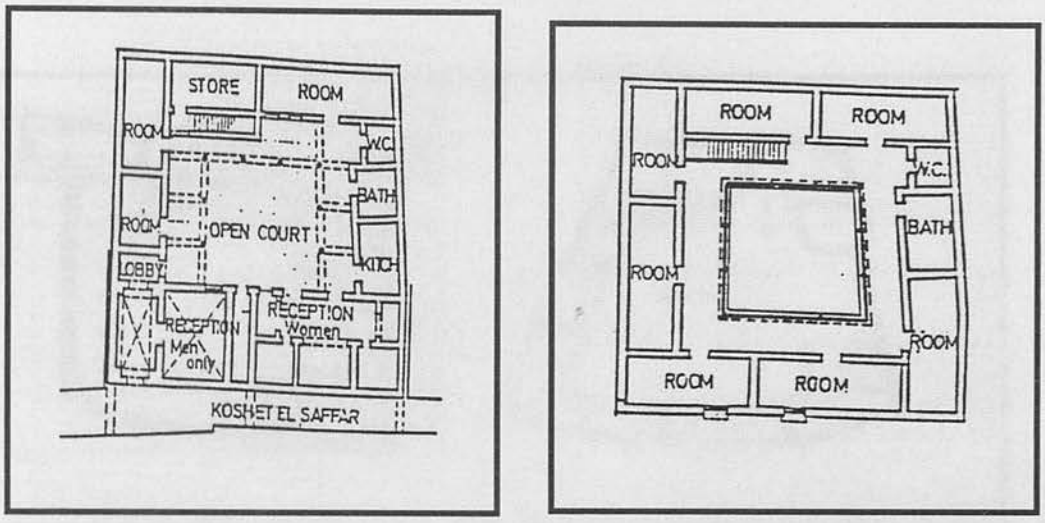
E= Entrance
G.R=Guest room
R= Room
K= Kitchen
T= Toilet

Figure 1: 8 Typical urban courtyard dwelling
(Source: Daza, 1982: 70)

The origin of this type of house goes back to the ancient days and was gradually developed and adapted during the Roman and Islamic period. The climatic adaption which was characteristic of the courtyard in this area lay in elements and features which transformed the hot, dry days and nights into more pleasant and liveable conditions through a passive cooling method. The layout of such houses within its urban tissue, with a single façade facing the narrow streets, minimises its exposure to direct heat. The nature of its construction and its material used added to the validity of the fitness between this form and its environment.

The form of the layout of such houses varies from one place to another, for example, in the Tripoli city house, they have a regular rectangular or quadrangular plan (Figure 1:9), with one or two floors and a courtyard in the middle surrounded by rooms open to this courtyard. The rooms usually had an elongated shape, like corridors. Many owners of such houses could divide the rooms into back niches and central spaces to break up

undesirable long spaces. Many long rooms were divided into two or more spaces whenever the residents needed extra rooms. These, as stated by Daza (1982) could then be used either for sleeping or for storage.



Ground floor plan First floor plan

Figure 1: 9 Courtyard house in old city Tripoli (Turkish period)
Source: Abubaker, 1996: 41)

In the case of the courtyard house in an urban area with its regular layout and rectangular courtyard, the rooms were distributed around only two sides of the courtyard. When the owner wanted to add space he used the two free sides of the courtyard. The wealth and poverty of the household could be judged by the quality, size, amount of decoration, and the materials used. Residents received their guests in a room called a Marbua[1] which was near the main entrance. In some cases in rural houses, if there was no guest room, one of the spaces around the courtyard was used as a temporary guest room. In many houses and wherever possible, they had two entrances, one to use as the main door and the other for use when there were male guests in the guest room, in which case it was necessary for female family members to be able to enter or leave the dwelling without being seen. The entrance to most of these type of houses was arranged in such a way that the visitor could not see into the rest of the house or its courtyard. In both the mountain and coastal areas, the characteristic

[1] Marbua, meaning guest room, is derived from Moraba (square). This expression was first used when people started using concert roofs which give them ability to construct square spaces, before that all spaces was rectangle.

construction of the courtyard house consisted of thick load-bearing walls of sandstone, limestone or mud brick. In the coastal area, walls were pre-finished with plaster and then white-washed from inside and outside. In the mountain area, plaster was only used for internal walls, keeping the outside façade finished in exposed stone (Figure 1:10).

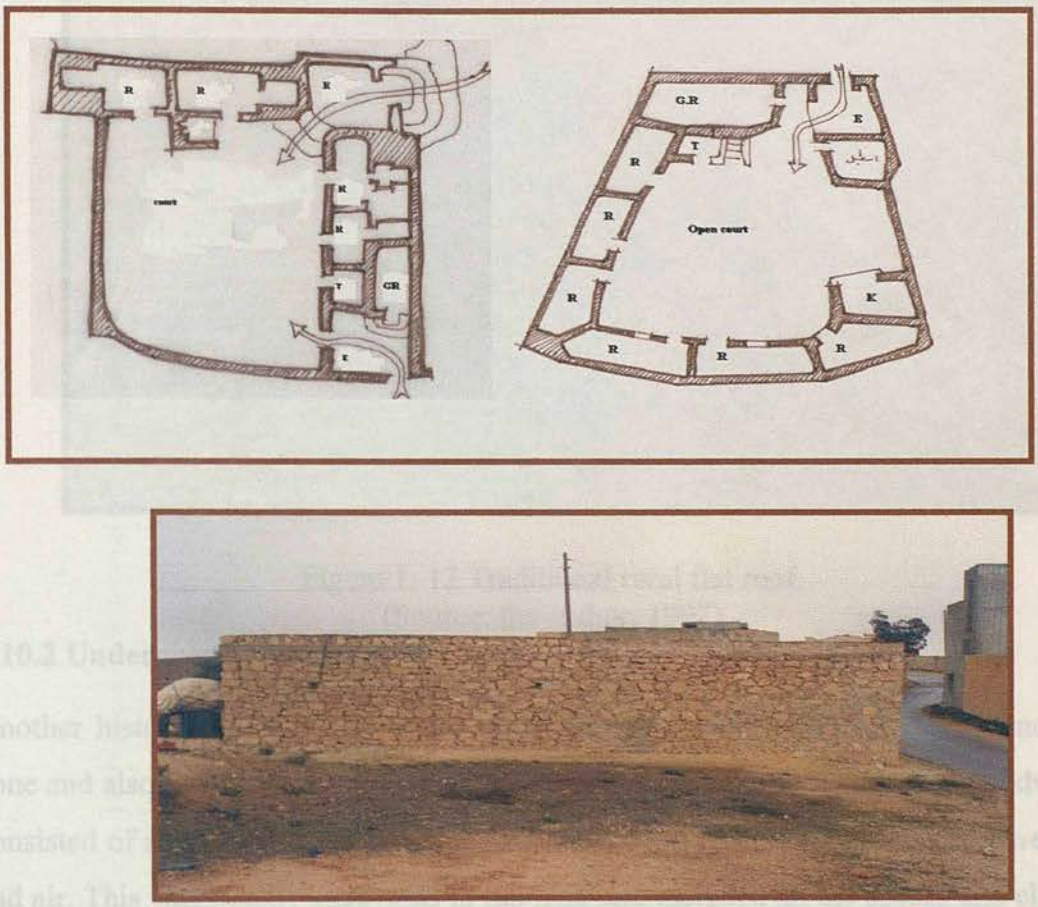


Figure 1: 10 Rural courtyard house in Zentan
(Source: Daza, 1982: 74)

The roofs of courtyard houses varied in Tripoli region, in the coastal area they usually were flat, built from joists and flat timber, if available or from tree trunks covered by clay and rubble which is decked and plastered. More recently concrete and cement have been used for water proofing (Daza, 1982)

Two types of roofing can be found in the mountain area: vaulted and flat. The vaulted roof was constructed using local stones arranged in courses leaning upon each other to form the heavy vault roof. These were then covered with clay and earth or gypsum. Flat roofs in the mountain area were made either from ordinary pine timber, with joists covered with timber boards and a layer of fine concrete, or palm-tree as shown in Figure 1:11.

covered with timber boards and a layer of fine concrete, or palm-tree as shown in Figure 1:12.

Figure 1: 12 Traditional rural flat roof.
(Source: the author, 1997)

1.10.2 Underground houses

Another historical house type found in the Tripoli region, especially in the mountain zone and also in southern Tunisia, is the underground dwelling. These types of dwelling consisted of an internal courtyard dug into the ground from which rooms received light and air. This was usually excavated in flat land and included all the spaces and elements which had already been developed in the walled court house (Figure 1:13).

Usually the courtyard was surrounded by a small parapet built from the excavation material to prevent people and animals from falling into the court. Rooms excavated into the side of the courtyard were finished with clay and sometimes decorated (Figure 1:14). Storage niches were dug into room walls and plates might be hung on the walls as decoration. Daily life activities would be carried out in the open courtyard while sleeping would take place in the rooms.

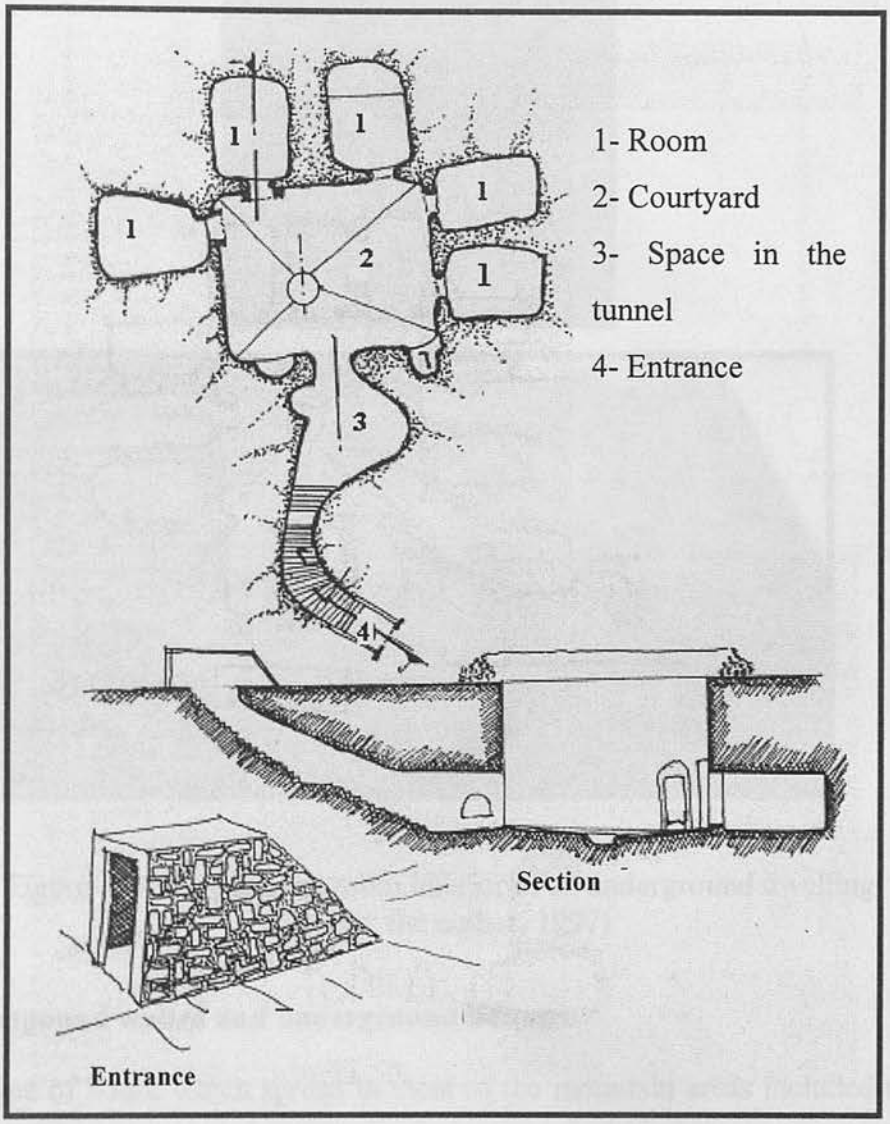


Figure 1: 13 Underground dwelling
(Source: the author, 1997)

The house as a whole accommodated an extended family; each room could be considered as a house for a single nuclear family. The head of the family, when he started constructing his family's house, would dig only one or two rooms. When the family expanded, perhaps through marriage, the head of the extended group added new rooms to the dwelling.

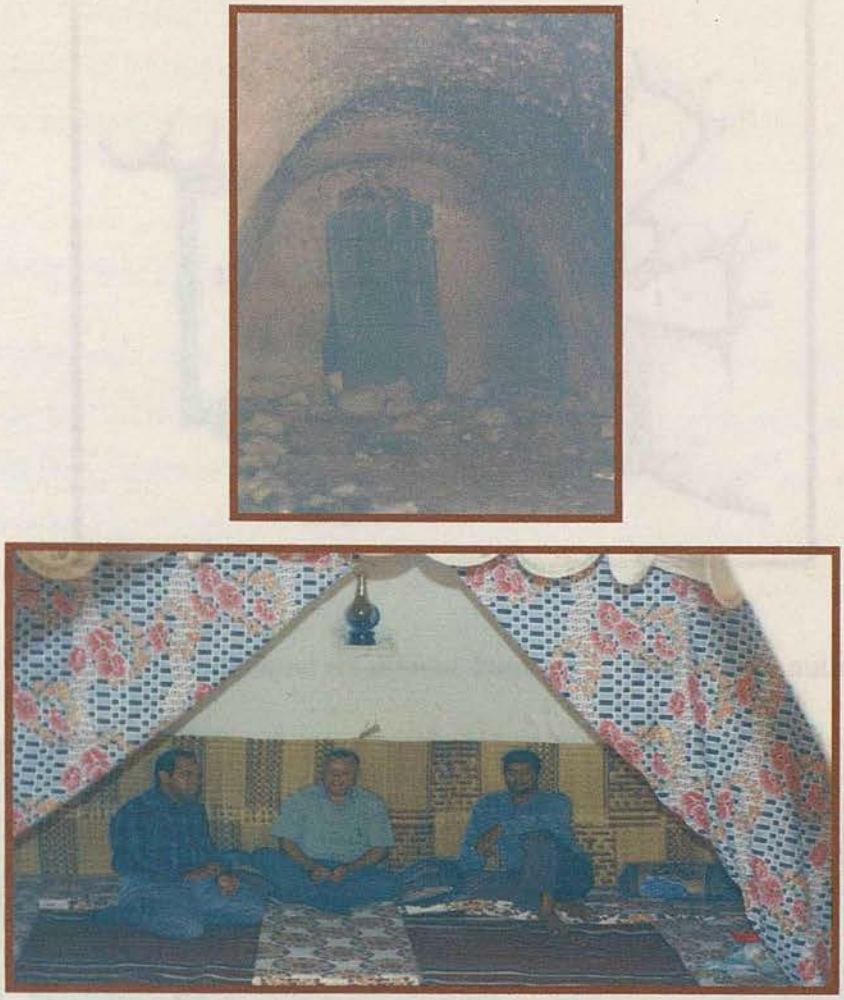


Figure 1: 13 Traditional room interior of an underground dwelling
(Source: the author, 1997)

1.10.3 Compound walled and underground houses

Another type of house which spread in most of the mountain areas included two parts: the first consists of underground units over ground spaces as in courtyard houses (Figure 1:14 and 1:15) and most of the rooms open to the courtyard. This type of house is always constructed on sloping land. The family would start by digging out the courtyard, which has a rectangular form. Then they excavated the underground spaces. The house could be considered complete after enclosing the external court with an earth or stone barrier. This barrier could be removed at any time when the family needed to add new parts to the original dwelling.

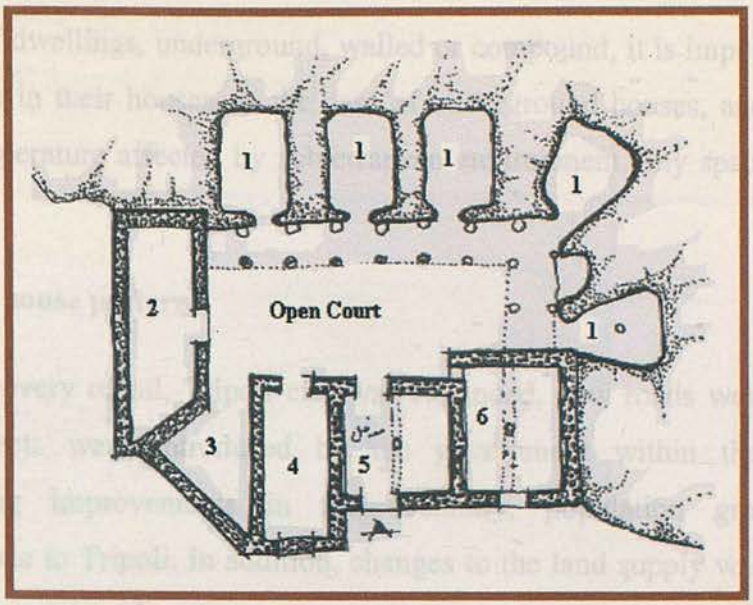


Figure 1: 14 Compound traditional dwelling (Source: the author)

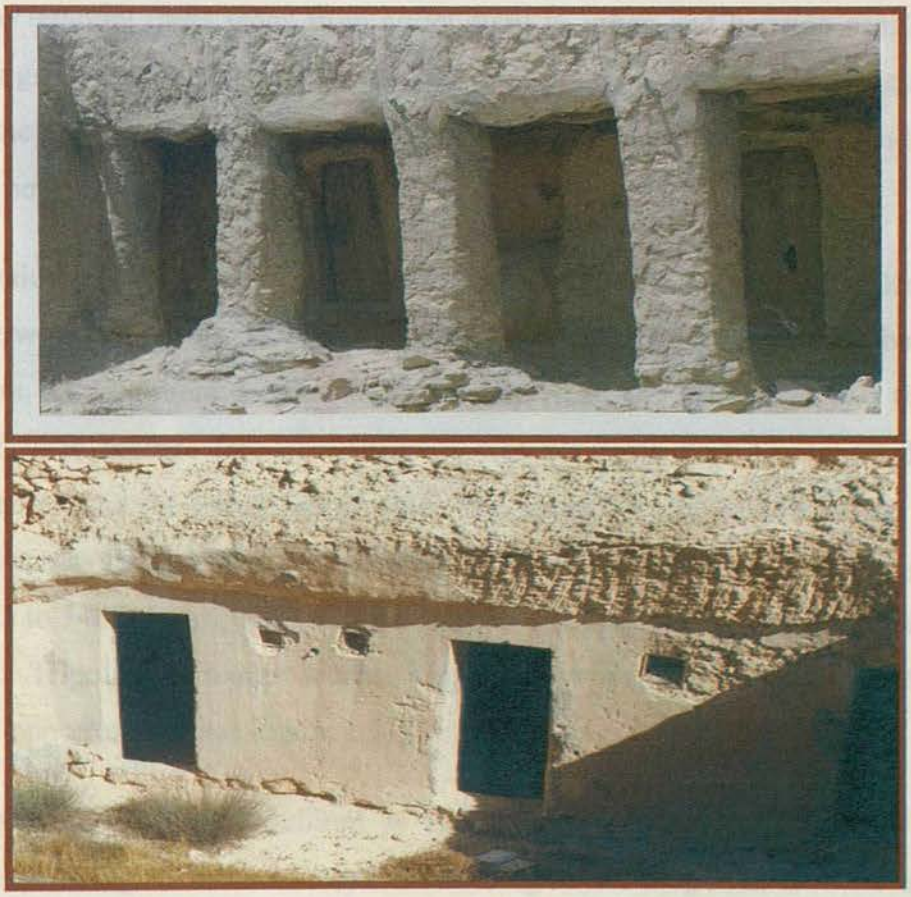


Figure 1: 15 Interior façades of compound traditional dwellings
(Source: the author)

In all types of dwellings, underground, walled or compound, it is important for families to have stores in their houses, in the case of underground houses, and because of the moderate temperature affected by subterranean environment, any space functions well as a store.

1.11 Modern house patterns

After the discovery of oil, Tripoli city was expanded, new roads were built and new housing projects were introduced by the government within their master plan accommodating improvements in the economy, population growth and high immigration rate to Tripoli. In addition, changes to the land supply was a strong factor for introducing many housing patterns. For example, in Tripoli city before the revolution, many Italian people owned a huge area of land, mostly distributed around the outskirts of Tripoli city. In the middle of the 1960s, most, if not all of these owners started to remodel these lands from agricultural to urban and housing use. New plots were designed, most of them not more than 144m², and approved by the authorities for sale on the estate market. In these cases the most important factor was the total number of plots, not their area.

The prevalence of the small housing plots at a distance from the city centre led to a type of house with one façade, its plan divided into three bays including three bedrooms, a guestroom, a living room, kitchen and bathroom. Access to the kitchen was through the courtyard. The average area of a bedroom was not more than 12m², and these were distributed around the living room, which was located in the middle of the plan. The guest room was located directly after the main house entrance, with an average area of around 13 to 14m² (Betru, 1997). These houses were aimed at and bought by the middle classes of Tripoli city, in other words, those families who came from different areas for new jobs opportunities (see Figure 1:17).

Generally speaking, most dwellings of this type had a staircase leading to the roof, where the washing room was located. According to building law, it is not allowed to build any structure on the roof except a washing room, which could not be more than 12m².

Materials used in such dwellings were limestone for load-bearing walls and reinforced concerte for the staircase and the roof. There was another material used for roofing

which were hollow clay blocks with in situ reinforced concrete ribs. Few houses were constructed with the column and beam system (Betru, 1997).

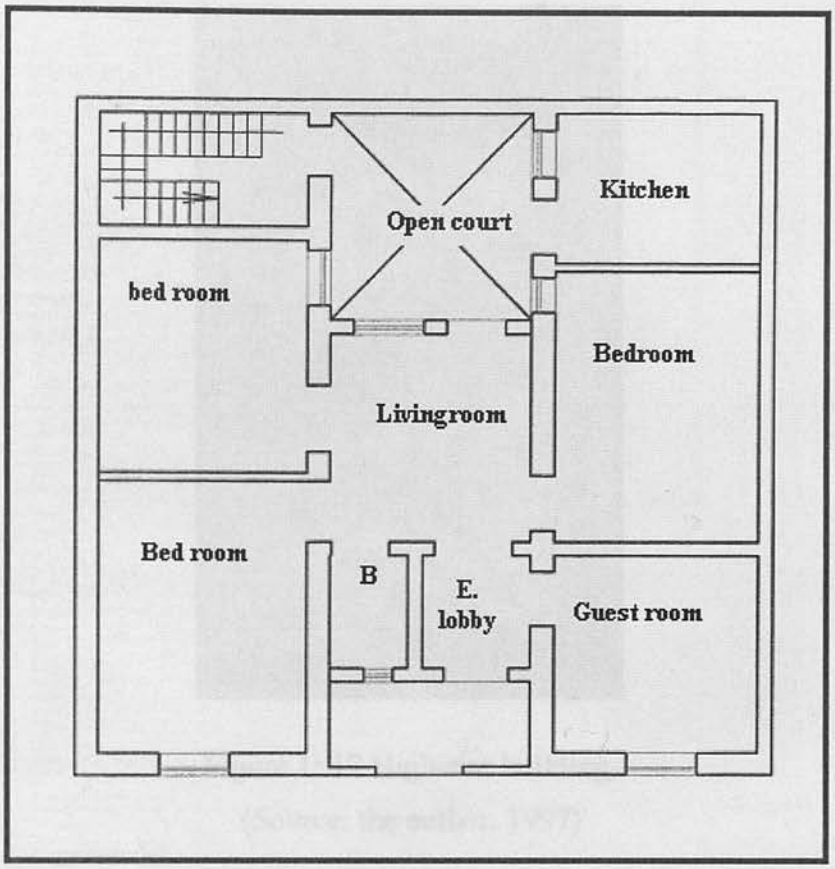


Figure 1: 13 Typical middle-class family house pattern, 1965-1975
(Source: the author, 1997)

This type of dwelling was built by the private sector during the late Sixties and early Seventies. Loans were made available to Libyan citizens in that period and the total amount was around 4000 LD.

Other dwelling types introduced after the oil boom and built by the private sectors were the villas or duplex apartments on plots ranging from 500m² to 1200m². In these types of dwelling, the owner participated in the design process, which was almost entirely done by commissioned professionals through public consultant offices. The owner had a chance to alter, add, and modify the design of his property any time through official procedure.

Also betwteen 1975-1985, the government made its own contribution, importing many new western models of houses, for example, the multi-storey building (Figure 1:18).

This type of building was built for low-income people, as a quick solution to accommodate migrants from the countryside in Tripoli and Benghazi.

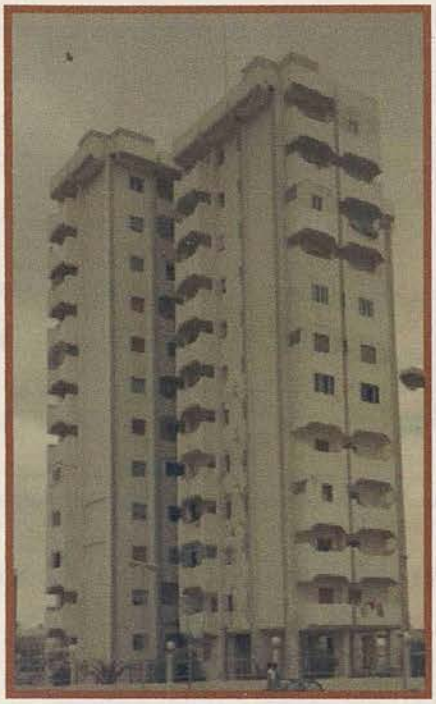


Figure 1: 17 High-rise building.
(Source: the author, 1997)

Basically, the design consisted of two bedrooms, living room, guestroom, kitchen and bathroom. Aburawi (1982), in his investigation found that the residents in such apartments, due to the small size, poor quality of space and the lack of privacy, carried out many alterations. Another example of dwellings constructed by the Libyan government were single units for the middle income class (Figure 1:18). This type of dwelling started to appear at the beginning of the 1980s. Dwellings of this type consisted of three bedrooms, living room, guest room, kitchen, bathroom and guest toilet. In this design, which still includes the courtyard, a backyard space was included for family activities. The structure of these units was beam and column, around which the internal partition walls were arranged, with an average thickness of 15cm. Most of the windows opened to the backyard or the courtyard. These units were constructed back to back in rows.

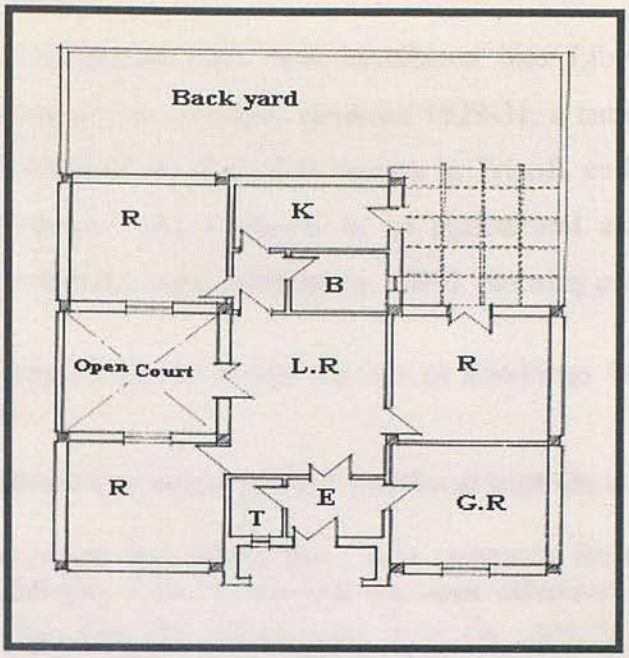


Figure 1: 15 New model introduced by the government during the 1980s
(Source: the author, 1997)

1.12 The change in the house model

During the last decades, the process of modernisation has strongly affected Libyan society. The shift from agricultural activity to industrial or semi-industrial activities has led to increasing employment and increasing annual incomes. As a result, differences in life habits between social classes have been reduced. The rapidity of this change has resulted in the presence of various living models, especially the social space of the Libyan dwelling.

The traditional Libyan dwelling was characterised by a clear-cut separation between the private parts of the home, secluding these from strangers and from spaces designated to receive visitors. The tendency was towards multifunctional rooms, and most of the family activity, especially in summer took place in the courtyard. The only space that was intended for a certain activity was the kitchen (especially in urban areas). The daily family life could take place in one of the rooms or in a space that was covered, there was no fixed room for children. When they were small, they slept with their parents and when they were older, alternative situations were provided such as, for example, adding a new space in the courtyard, or by dividing an existing room into two spaces.

1.12.1 International style

The international architectural style was introduced into Libya during the Italian occupation of the country. For example, between 1929-31, a national competition was announced for the layout of the Cathedral Square in Tripoli, calling for the design of houses, for typical houses and a church in an agricultural area. This competition included three stages (Grillo, www.archnet.org. 2003). Housing projects should include:

- Designing three-storey buildings for use as dwellings on 3 floors above the ground floor;
- The buildings were to have a portico/ arcades at least 4m wide; and
- The announcement also stated that, "it is necessary for competitors to seek a sense of modernity those forms that are most effective in creating an Italian colonial architecture that should stem from the merging of local architecture features with those of artistic tradition" (Grillo, www.archnet.org. 2003: 41).

Within 40 years the Libyan house had changed dramatically and was characterised by a tendency towards assigning as much as possible, one room for one function. The house came to consist of a series of rooms, each of which was defined by a primary activity. The type of furniture changed completely, the most obvious change being that the courtyard was no longer surrounded by the building; the building was bounded by open space (Figure 1:19).

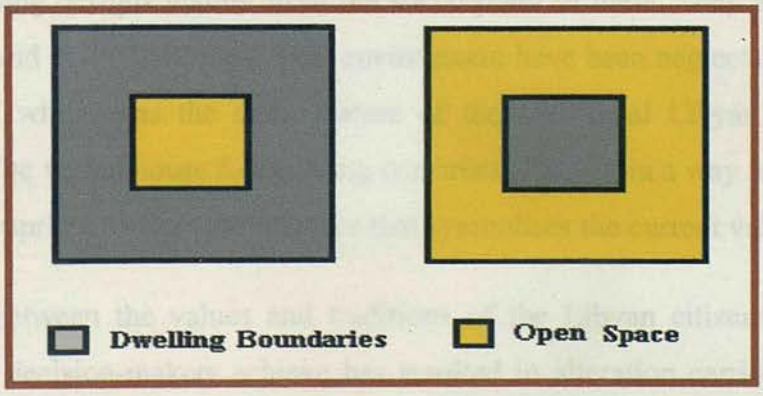


Figure 1: 19 Main changes in Libyan house model

> "Even where the original town or village has largely survived, it now represents a mere division of the built-up area, usually accommodating a small share of the total urban population. New and distinctly alien elements have been added to the townscape villa developments, flats, shops, garages, industrial estates. In most cities today the characteristic skyline of domes and minarets is overshadowed by one characteristic of almost any Western city with high-rise apartments, and office

> blocks. Stone and mud have been largely replaced by bricks and concrete as building materials and indigenous architectural forms have almost entirely disappeared. The centre of gravity has shifted from the old towns to the new, and, as urbanisation proceeds, an increasingly high proportion of the population is living in a western style of urban environment'' (Beaurmont, 1976: 217).

New trends in public housing can be seen as the concurrent outcomes of three processes: the formal representation of space by the state, the official practice that takes place in the space, and the perception of space by citizens, including their daily activities (Kallus & Yone, 2002). This research is oriented to investigating the third level of this process by examining the alterations carried out in public housing in Libya.

1.13 Conclusion

Historically, it has been observed that Libya is undergoing rapid change, politically, economically, as well as socially. Due to improvements in the health and economy, the living standards of the population as a whole have changed. This has put the Libyan government under pressure to offer suitable housing. Many system have been adopted, for instance, high-rise buildings, single-storey houses and medium-rise buildings.

In spite of the huge programmes so far achieved, Libya needs more units to face problems of housing shortage. Many researchers (Abubaker, 1996) pointed to the failure of public housing designs mainly from the social point of view. They argue that many parameters found in the traditional built environment have been neglected, most notably the courtyard, which was the main feature of the traditional Libyan house but has disappeared. The varied house forms being constructed today, in a way reflect a struggle to find an appropriate modern architecture that symbolises the current values.

The conflict between the values and traditions of the Libyan citizens and what the designers and decision-makers achieve has resulted in alteration carried out to public housing. In the next chapter, the phenomenon of dwelling alteration will be explored.

Chapter Two
The Phenomenon: Dwelling Alterations

2.0 Introduction

There is growing concern for the quality of the physical and social environment and this has prompted researchers (such as in the fields of psychology, sociology, and neigbourhood quality) from various disciplines to concentrate their research efforts on contemporary environmental problems. This area of interest embraces the fundamental assumption that an understanding of the relationship between man and the environment, gained through scientific inquiry, would provide guidelines for improving urban planning and design.

Among the phenomena that have attracted attention are those related to how building users award their housing environment with meaning, how they personalise it and, of more recent interest, how they make their contribution in shaping and improving the quality of their environment.

Dwellings change. They do not remain unaltered. Extensive research and investigations carried out on this subject give recognition to this fact. In the light of the fact that much new housing in Libya is supplied by agencies (governmental and private) to their users, with user-involvement only starting at the moment of building occupancy, the issues raised by changes they make to their dwelling is significant. This chapter therefore, asks why do home owners alter their homes, in order to set the parameters for the investigation. It then attempts to discuss some definitions of terms which are used in this research, and goes on to review the existing literature on transformation that homeowners make in their homes. The main objective of this chapter, therefore, is to identify those theories relevant to the study of user-made transformations and alterations in public housing.

2.1 Definitions

The field of study outlined above is rich in terms that come from common usage, and therefore poorly defined words such as ''alteration'', ''improvement'' and ''repair'' are open to a range of loose interpretations. This lack of rigor in in-depth analysis and definitions prevents comparison of results from different research projects which is one of the main criticisms of literature on dwelling alterations. These definitions produce a clear and precise understanding of the way the terms are used. Sequentially, this leads to a clearer understanding for the reader. Golton (1997), in

her study suggests the following terms for consideration alteration, improvement, repairs, and to transform.

2.1.1 Alteration

Alteration is ''a change or modification'' (Macmillan Dictionary, 2003) in which change means to make or become different, to replace with or exchange for another Golton, (1997) suggested that two issues are, therefore important to the definition of alteration:

- An action producing a change in the building including removal, exchange or installation of any item or element; and
- The action can make the building better, worse or maintain the status quo.

According to Morris and Winter, housing adjustment can take four forms. The first two of which do not result in physical change. These are: normative family adaptation, where the family alters its norms to adapt to current housing conditions; and structural family adaptation, which includes compositional and organisational adaptation of the family to its current housing. The other two forms of housing adjustment result in a physical change: residential mobility, including migration and intra-urban mobility; and residential alterations to make the current housing more suitable (Morris and Winter, 1978).

2.1.2 Improvement

Improvement is ''the state of being better than before, or the process of making something better than it was before'' (Macmillan Dictionary, 2003) which means to improve, to make or become better in quality (Golton, 1997). In general usage, improvement is an alteration resulting in a betterment of the existing situation. It is subjective in nature, and implies very little about the building before improvement, whilst emphasising building improvement after alteration. In the construction industry, an improvement occurs where the intention is to increase the efficiency in the use of the building by adding facilities that were not previously present (Golton, 1997). The definition of improvement generally includes the following factors: making the property better from the point of view of the occupant; being a deliberate, rather than accidental, action, and one that leads to the provision of something different than before the improvement action.

2.1.3 Repair

Repair is "to fix something that is broken or damaged or a work that is done to fix something, to restore to a good condition or working order" (Macmillan Dictionary, 2003). In general usage, to repair is to restore some part of the building that has become defective. There is an implication of a cycle of a non-defective building becoming defective and then, due to repair, becoming a non-defective building again. A repair is a return to the status quo of the dwelling before failure and is not necessarily a return to a better position. If a better situation is obtained then the action has a component of improvement. The extent to which an action is a repair or improvement is a subjective decision and depends on the extent and type of action occurring (Golton, 1997).

2.1.4 To transform

To transform is "to make something completely different order" (Macmillan Dictionary, 2003). In this regard, Tipple (2002) states that transformation could be expected as a manifestation of the alienation which occupants are bound to feel. The phenomenon of transformation is inherently one facet of the housing adjustment process. Theoretical analysis of the phenomenon is absent from literature on housing in the third world. Thus the literature simply implies that, due to the changing needs of the households, or the changing demands in the housing market, certain adjustment, mainly in terms of improving or moving, are made by the households concerned (Salim, 1998). Many researchers (Tipple, 2002; Seek, 1983) indicate that housing alteration theory, filtering theory and transformation theory are related theories to housing transformation and why people alter their dwellings.

2.2 Why do people alter their homes?

Golton (1997) recognises the influences on dwellings' alteration as being of three types: push, pull or prerequisite influences. Of these, the push influence actively encourages dwelling alteration, for instance, there may be the need to add a new room or a garage. Pull influences are factors preventing changes, such as deficiency of money. Push and pull factors occupy a sliding scale from a very influential push factor through factors with a minimal influence on alteration to very influential pull factors. Prerequisite influences are factors necessary for the alteration to occur. If they are not present, the alteration is unlikely to arise.

This section focuses on the push influences, as the other two factors are largely contingencies. It covers a range of potential stimuli suggested in the literature on dwelling alteration, investigates any link between dwelling adjustement and user satisfaction, one of the core idea of this thesis. Push influences therefore, represent human needs, first it looks at basic functions; does the dwelling serve or translate the occupant, and his/her way of life?

2.2.1 Functionality

When considering changes in dwellings, one common reason for altering is functionality. This means how the house acts as a domestic activity centre for the occupiers. In other words, the relationship between occupiers and lifestyle, (the particular way in which the occupier lives) so the altering adapts the initial dwelling design to suit the individual's lifestyle and improves the function of the dwelling.

2.2.2 Economic issues

Housing development in general can be regarded as responding to broad market signals. Tipple (2002) hypothesised that transformers will respond to the same signals and form part of the adjustment mechanism by which housing market equilibrium can be restored after a shift in demand. Within this context, it could be expected that transformers would take the value of the most desirable houses in the neighbourhood as representing some ceiling to their own investment. In this case the price of a small house with an extension is unlikely to exceed the price of a large house.On the other hand, there seems to be no reason why the price of a small house with a large extension should not keep pace with the price of a large house with a smaller extension.

2.2.3 Control and freedom to alter

The concept of control is complex and has been studied in various forms by researchers concerned with two issues: territoriality and dominance. On the one hand control has been defined by psychologists as a character trait, and as such, permanent in nature. However, control has also been defined as a class of social behaviour directed toward influencing others, as well as a proprietary attitude or a feeling that one can control events within a spatial area. Fitzhugh *et al.* (1980) discuss the negativity of the poor and attributed it to their feeling that they were controlled in

their environment, rather than being in control of the environment. Fitzhugh *et al.* noted that many families eligible for subsidised housing prefer to remain in substandard housing (i.e. housing inadequate with respect to crowding, structural conditions, and plumbing), rather than move to available public housing. The reason for this refusal to move was felt to be the belief that in subsidised housing, they would be forced to surrender what little control they presently had, and would be made to live by the rules and regulations of the housing authority.

2.2.4 Satisfaction and alteration

Types of interventions related to resident satisfaction can be either active, passive or balanced as suggested by Lansana (1992). Active intervention relates to interventions carried out by residents when there is a misfit between the housing providing and residents expectations. The satisfaction derived then depends on the interplay between the residents expectations and the degree to which the altered housing environment fulfils these expectations.

2.2.5 Self expression

Personalisation has been defined as the ''expressive display of the occupant's values, status, identity, preferences, and activities'' (Fitzhugh *et al.* 1980), almost any action a resident might take to modify his or her living environment. Various researchers have examined the phenomena of personalisation or territorial marking. The agreement is that human beings do, indeed, mark or personalise their environments, and that other human beings respond to this personalisation (Fitzhugh *et al.* 1980).

Various motives have been suggested for personalisation. Fitzhugh *at el* (1980) state that personalisation occurs because it reinforces the occupant's self-image. It expresses that image to others, and is important in demonstrating the occupant's control over a surrounded area. Further, they observe that personalisation seems to reflect the occupant's satisfaction in involvement with his environment. Thus, Fitzhugh et al conceptually link personalisation to control and, in terms of pride, to satisfaction, but with no explicit statement as to the causal relationships. The question of a sequential order of personalisation, satisfaction, and control is not considered.

Golton (1997), although stating that the desire to be different is one of the reasons behind dwelling alteration, does not provide any supporting evidence as to why households wish to be different from their neighbours. The owners may want to be different because of their belief in the importance of individuality, to show they belong to a specific status group, or they might want to reduce the uniformity of public housing for aesthetic reasons.

2.3 Housing adjustment

Family housing behaviour can not be understood if the whole configuration of influences that lead them to alter their dwelling is not taken into account, not only at a specific instant in time but also at significant times in the past. There may be strong pressures that push families to give at least some weight to cultural norms even if their norms are very unusual. (Morris and Winter, 1987) add that housing adjustment tends to occur whenever the family has a normative deficit that causes a significant reduction in housing satisfaction, when the deficit is perceived by the family and involves a salient housing condition, the deficit reduces housing satisfaction.

Families are self-regulating, rational systems. They process information and attitudes for the purposes of planning their future housing related behaviour. Taking into account their current housing, the current level of satisfaction, and their aspiration for the future, along with their reasonable expectation, the family may act at least somewhat rationally to achieve their housing norms (Morris and Winter, 1987).

Because the rental housing system has not been seen as a solution to the housing problem, since there is no control on rents, and they are increased with increases in inflation, people prefer to own a dwelling whenever they get an opportunity. Therefore, families live in their dwelling for a long time, since they lack the economic power to change to their home to a bigger or more adequate one. Instead, residents try to solve the emerging spatial needs by making some alteration to their existing dwellings, and thus adapt the space to their changing needs. Esin *et al.*, (1998), add that the growing demand of residents for a better quality of housing is another problem, especially in third world countries, where efforts in housing have been directed towards meeting the quantitative shortage of dwellings, and not the qualitative aspects of housing. In the above circumstances, adaptability becomes one

of the essential spatial features for residential satisfaction of dwellings of mass product types.

2.4 Filtering theory

Filtering frequently means a process whereby households adjust their housing in accordance with their changing income and preferences. The origin of the concept of filtering started in Great Britain after the Industrial Revolution (Salim, 1998). Literature on filtering in the western context suggests that there are two types of filtering: filtering up and filtering down (Tipple, 2002).

2.4.1 Downward filtering

It is suggested that the lowest-income households benefit eventually from the provision of houses for high income groups through the handing down of old housing stock. Ratcliffe (cited in Salim, 1998) stated that the filtering process is the result of the decline in the value of the property and a change in occupancy. A common feature of filtering theory is that it is formulated in the western industrialised countries where private housing markets are established and organised. In this context, filtering has often been advocated as a policy whereby housing units are built for the higher income house buyers and, when these houses decrease in value and quality, they become available to the lower income groups. The filtering process is then perceived to be a justifiable move for certain policy directions regarding the type of housing stock to be constructed in response to the housing demand of different income levels (Salim, 1998).

2.4.2 Upward filtering

In the case of developing countries, property inflation rates and the demand of housing at different income levels are often high while the housing supply is chronically limited. Often the price of these houses rises faster than real income. These conditions inevitably lead to the reduction of housing stock in the market. As Strassmann (1977, 313) puts it:

> ''Given the rates of income and population growth for poor countries and the low rates of construction, housing shortages and upward filtering (of houses) are perhaps the more common phenomena.''

Gosling *et al.* (1991), in their study of Wokingham in the UK, found that the widespread act of building extensions represents a progressive upgrade of the property to achieve higher space standards and quality. To them, house extension is part of housing development and they argue that house extension should be considered as an integrated element in a dynamic market system. The rationale raised here is that, with rising housing prices, householders are inclined to extend.

2.5 The housing gap

Urbanisation in recent decades has resulted in increasing housing problems in Africans cities. Governments in most developing countries, such as Libya, the area of concern in this thesis, has undertaken programmes to alleviate housing problems. Since housing adjustment implies improved housing conditions, understanding the determinants of housing adjustment can help formulate appropriate policy solutions. Understanding the determinants of the choice between the two modes of residential adjustment can help planners locate and target recipients for such programmes.

In his article Seek (1983) states that few households are likely to remain completely satisfied with the house indefinitely. At some point, a household may desire some housing attributes that are not provided by the current dwelling, which indicates a gap between the actual and the preferred level of housing and this gap can be brought about by a variety of factors.

2.6 Moving or improving

Housing consumption is seldom adjusted immediately after or before change in demand, households seek a satisfactory residential environment. If the characteristics of the house or neighbourhood no longer satisfy a household (because of a change in house or neighbourhood condition itself), then households experience stress (Seek, 1983; Quercia & Rohe, 1993). If ''dissatisfaction or stress mounts over time, here will be a critical level, at which a decision will be made on the best course of action to bridge the gap between the current and the desired amount of housing. And most households have a certain degree of tolerance for stress; each has its critical level before something is done to alleviate it'' (Seek, 1983).

In this case there are number of actions available to an owner-occupier to change his/her housing consumption. Improvement can be made to an existing dwelling, a

move made to more suitable dwelling. (Seek, 1983; Sinai, 2001). Whichever alternative is selected depends on the relative costs and benefits associated with each course of action. Seek (1983) and Sinai (2001), added that the benefit must be large to more than cover the 'dissatisfaction' and the adjustment costs before any action is taken.

2.7 Adaptation

Adaptation as a term is an ambiguous one. According to Berry, (1976), it may refer to a change in behaviour, changes in culture or both. Which are associated with changes in the built environment? If we consider alteration and modification of the built environment in general and specific in homes as an attitude, then for sure it will be considered as an adaptation.

Adaptation is defined as covering any alteration done to adapt the environment to the changing needs of the occupants in time. When some people find that their physical environment does not accommodate their needs, they change it; they become designers, (Zeisel, 1984). Adaptive traces are significant for designers because they are direct manifestations of design by users. Researchers and designers can learn a great deal from this adaptive redesigning (Zeisel, 1984).

Adaptation is a natural process by which man acts to solve problems in a given situation. The adaptation to the environment occurs in a process of trial and error, with the successful results being retained and passed on through cultural traditions, which include knowledge, skills, technology, and science (Abubaker, 1996).

Etzion *et al.* (2001) state that, while a number of field studies on the general causes and socio-economic consequences of housing modification have been carried out, they have been hampered by difficulties in recording, classifying and analysing the changes in the field. They suggest that these tasks could be performed efficiently using geographic information system (GIS) technology, which has become widely available in recent years, although GIS and its use in architecture and urban design remains rather limited due to number of reasons. Firstly, it is geared for working with two-dimensional systems, while architecture and urban design deals with three-dimensional forms. Secondly, the use of GIS requires a thoroughly standardised quantitative input, while the attributes of architecture and urban design are extremely diverse and often difficult to quantify. The criteria they employed in their study are:

location of modification, nature of change, orientation, size of change and other related changes.

In a study sponsored by the World Bank, Strassmann (1982) revealed that poor households save and work to transform dwellings progressively in a variety of ways. They can use current income, liquidate existing savings, borrow from relatives, or take out material or general construction loans. He adds that one pattern is clear: constraints of any type inhibit the transformation of housing. In some countries occupants must follow predetermined housing regulations, whereas in others, they are only required to convince inspectors that they are building in a structurally sound manner. A few countries prohibit renting, subletting, or selling sites with its newly built or newly upgraded dwelling for several years to anyone, other than the supervising or lending institution.

Strassmann (1982) goes on to suggest that, the upgrading or transformation of housing must be understood in terms of the changing housing market as a whole. The demand for new dwellings or for improvement depends on population growth, household formation, migration, personal income growth, income distribution, access to land and finance, the availability of competing goods and services, the characteristics of the old housing stock, and various regulations.

Strassmann (1982), Seek (1983), Gosling *et al.* (1991) give attention to the housing market and dwelling investment without giving consideration to the dwelling owners' experience and its effect on carrying out alterations. This will be discused in Chapter Five of this research.

2.8 The concept of home and alteration

Unfortunately, the majority of literature on the home does not consider the inter-relationship between the home and the physical dwelling. Therefore, understanding an alteration's influence on the home may assist in providing housing in a form that allows the development of a residential unit by the occupier to suit their dwelling needs. In turn, this maximises the contribution of housing to the occupier's well-being, as well as contributing to an improved understanding of the home itself (Golton, 1997).

Golton (1997) says that consideration of dwelling alteration and the idea of home is particularly important as the dwelling will be in use and should remain a home for a considerable time. The concept of home influences dwelling alteration in a simple way, the occupier has a cognitive concept of home, which they compare with the reality of their physical dwelling. Assuming a home is desired, a significant mismatch between the concept and reality prompts occupiers to change their dwelling to match their concept of home (active adaptation) or change their concept of home to match their dwelling (passive adaptation). Dwelling alteration can be seen as the process of active adaptation by the individual in order to:

- Support and maintain the economic investment in the dwelling,
- Support domestic activities within the dwelling,
- Support and maintain the physical condition of the dwelling and
- Support the creation of a home through reducing the mismatch between the home concept and physical dwelling.

2.9 Housing market adjustment

Gosling *et al.* (1993), in their investigation into dwelling alterations, hypothesise that house extension follows a cycle that largely corresponds with the cycle in housing construction. This in turn reflects closely the cyclical pattern of house price. If housing demand increases, perhaps as a result of long term increases in real income, this is likely to bring forward more land for housing development. Where housing land is in restricted supply, whether due to town planning controls, physical constraints or competition from other users, this may lead to more intensive use of housing land. If such intensification occurs, and this will depend on the willingness of consumers to substitute capital for land as land prices rise, the density of previous vintages of housing development will begin to look low. This then might result in pressure to intensify the use of existing housing land by means of house extensions.

2.10 Transformation in Africa

Many studies have been carried out in Africa to investigate the phenomenon of alterations and modifications carried out by the owners. One of the UK Overseas Development Administration (ODA) sponsored international comparative studies which have examined transformations in Egypt, Ghana, Zimbabwe and Bangladesh, with a view to showing whether, on balance, government and citizens have more to gain by encouraging transformations or by attempting to prevent them. The following pages give an overview of this research, as covered in Tipple, (1996).

2.10.1 Transformations in Egypt

In Greater Cairo, residents of five-storey walk-up flats in Workers' City, Helwan, and Medinet Nasr, have managed to extend their properties by co-operating amongst themselves to engage specialised contractors to build stacks of rooms attached to the original building (Figure 2:1). Through a combination of internal alteration and outward extension, they have increased their living space by 57% from a median of 26m² to one of 42m². This activity began in earnest around 1980 when the first occupants had passed the 15 years in tenancy landmark, which signalled their attaining ownership of the two and three-roomed flats. Despite increases in population consequent upon the growing households and the unavailability of alternative accommodation for young married couples wishing to leave the parental home, transformation has increased the floor space per person by more than 1m², to 10m² habitable space per person, and kept occupancy rates down to 1.2 persons per room (Kardash, 1993).

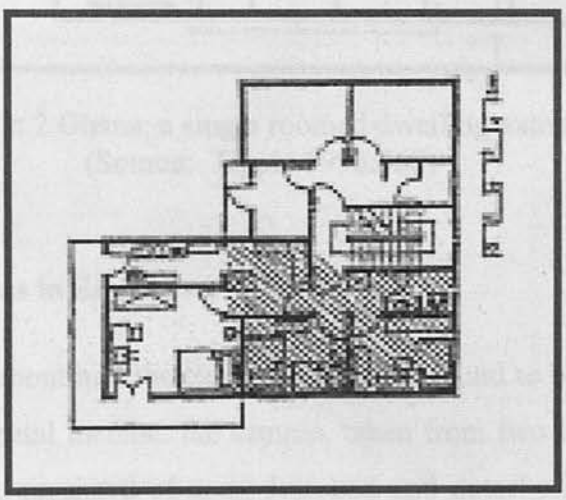


Figure 2: 1 Egypt: a two roomed flat extension
(Source: Kardash 1996: 270)

2.10.2 Transformations in Ghana

In Kumasi, Ghana, there are two house types which present contrasting potential for extension. Many of the original dwellings are single rooms with verandas set in terraces, so the narrow frontages severely constrain the potential for extension activity. The remainder are semi-detached dwellings standing in their own plots, many of which are very substantial. They were built in the 1950s. Overall,

transformations have allowed the main householders, most of whom bought the original dwellings from the State Housing Corporation, to increase the habitable space from a median of 24m² to 54m², and the habitable rooms from a median of two to six per house. Although many more people live in the houses than when they were first built, transformers have more habitable space per person 5.6m² than non-transformers 4.4m². The habitable space available to the main household has increased to 40m² and four habitable rooms. At the same time, they have provided new accommodation for tenant households in 27% of houses and rent-free (family) tenants in 33%.

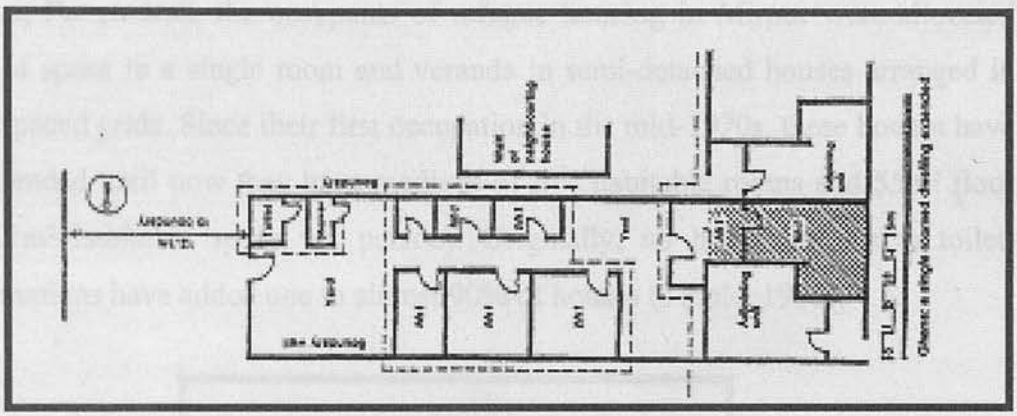


Figure 2: 2 Ghana: a single roomed dwelling extended
(Source: Tipple 1996:368)

2.10.3 Transformations in Zimbabwe

In Harare, Zimbabwe about half the transformers were found to be motivated mainly by the possibility of rental income. the sample, taken from two local authority low-income housing areas, consisted of semi-detached and detached bungalows whit a 30m² habitable area at the median, mainly with three habitable rooms and a kitchen, set in relatively generous plots (250m² at the median). Transformations began when occupants completed paying off their housing loans and achieved habitable spaces of 53m² and six habitable rooms per house at the median. Main households benefited by 4.4m² at the median and two tenant households per house are now accommodated. Some of the rented space is in the form of sectional wooden structures (known as shacks), but the remainder is, as in the other countries studied, at least as high in building standard as the original structures (Tipple, 1996)

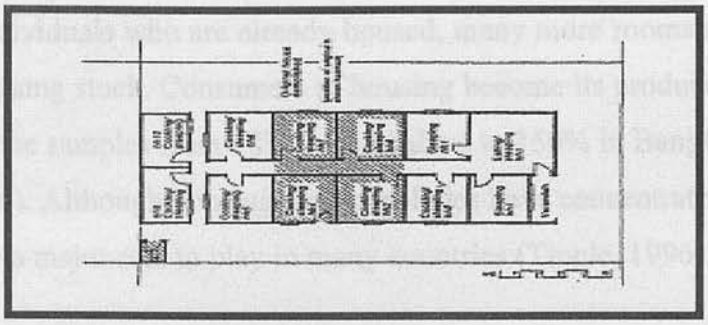


Figure 2: 3 Zimbabwe: a typical enlargement into a multi-household villa (Source: Tipple, 1996:368)

2.10.4 Transformations in Bangladesh

In Dhaka, Bangladesh, the occupants of refugee housing in Mirpur were allocated 22.2m² of space in a single room and veranda in semi-detached houses arranged in closely-spaced grids. Since their first occupation in the mid-1970s, these houses have been extended until now they have medians of five habitable rooms and 55m² floor area (3.2m² habitable space per person). Originally, no household had a toilet; transformations have added one to almost 90% of houses (Tipple, 1996).

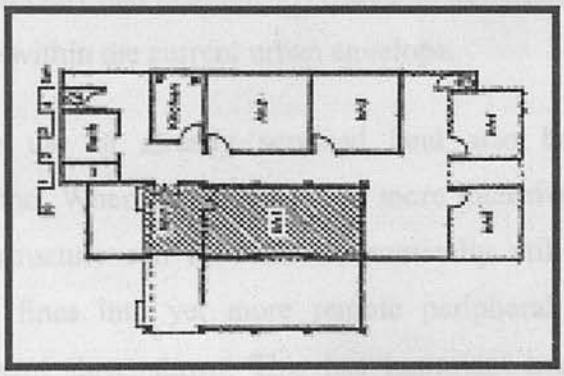


Figure 2: 4 Bangladesh: a house on a wide plot with five households in residence. (Source: Tipple, 1996:368)

2.11 Transformations and sustainability

It is an interesting question as to whether transformations can contribute to the urban environment in ways that are congruent with the aims of sustainable development and the Global Strategy for Shelter (Tipple, 1996).This section focuses on the contribution transformations can make to sustainable development.

Transformations as an effective housing supply mechanism. The feature of transformations which most firmly establishes them as a positive element in housing is the inroad they make into the housing-supply backlog. Through the action of

thousands of individuals who are already housed, many more rooms and services are added to the housing stock. Consumers of housing become its producers. Increases in space varied in the samples from 48% in Zimbabwe to 150% in Bangladesh as shown by (Tipple, 1996). Although housing supply policies have concentrated on new starts, extensions have a major role to play in many countries (Tipple, 1996).

Transformations as making effective use of existing limited resources, particularly serviced land, infrastructure and construction materials .Particularly in areas developed by colonial governments (or in the style inherited from them), government-built housing areas are often the least densely developed residential neighbourhoods within the established urban area (Tipple, 1996). Their location more than 20 years ago at the peripheries of pre-colonial urban settlements is now relatively central and generously spaced small dwellings are no longer appropriate on such valuable land. Transformation is increasing the density of development on these prime sites to levels more appropriate to their locations. Thus, the land is being more efficiently used (Tipple, 1996). As a consequence, less new urban land needs to be carved out of economically and ecologically valuable agricultural land or forests, as more people can live within the current urban envelope.

The growth of the use of already serviced land also has major effects on infrastructure provision. Where serviced land is more intensively used, the existing investment in infrastructure can be more economically utilised. In addition, the extension of utility lines into yet more remote peripheral areas is delayed as peripheral development slows down. This has important transportation spin-offs, also. The more people that can be housed close to the city centre, the lower is the commuter load. Not only does this reduce total mileage for public and private transport, it is also likely to reduce the scale of the peak flows and the difference between peak and off-peak flows (Tipple, 1996).

Transformations improve the social, economic and environmental quality of the living and working environment. Improvement is a little like beauty; it tends to be in the eye of the beholder. For one, a well-built brick extension to the front of a house not only contributes more living space, but also stamps the neighbourhood with a look of modernity and progress. For another, the same edifice is a blot as it breaks the regular line of the facades and imposes a non-conforming material (Tipple, 1996).

Neighbourhoods appear to be more socially heterogeneous after transformation than before. In Egypt, for example, Helwan City, and Medinet Nasr, the residents are middle aged with grown up children. Through the extension activity, the second generation can remain in the neighbourhood, introducing young married couples back into the social scene (Tipple, 1996). Tipple found that additional space can be used for economic activities if desired. It has been found that between 11 and 25% of houses in Bangladesh, Ghana and Zimbabwe had a commercial use within the house. It is widely accepted that working in the home is an effective poverty alleviation measure, where even poorly paid working can make a real difference. In addition, the opportunity to rent out additional rooms is important for many households' ability to pay for and maintain their houses or as a means of livelihood for the old. Between 27 and 71 % of the transformers in Bangladesh, Ghana and Zimbabwe rented out at least one room.

Transformations make efficient use of existing social resources. Tipple, (1996) argues that sustainable development stands on three supports: environmental, economic and social sustainability (Figure 2:5). The last of these is, perhaps, the most intangible and the most difficult to address with policy, although successful neighbourhood upgrading is likely to contribute to it. While positive steps can be taken by reducing social exclusion, one important element of social sustain- ability is the maintenance of existing social networks, often manifest as local social systems or that vague concept: community.

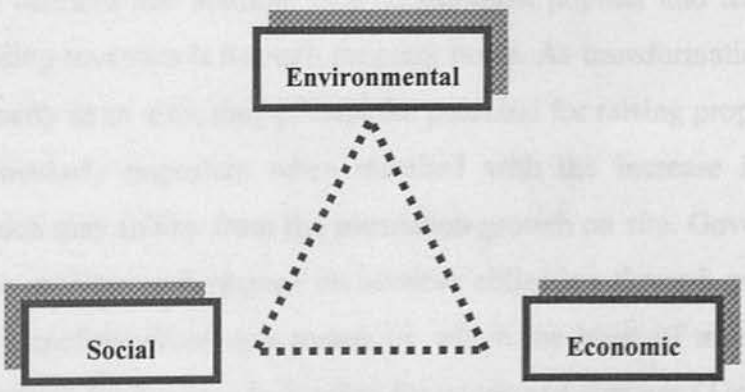


Figure 2: 5 Three supports of sustainable development

The maintenance of existing housing areas and, more, their continual improvement over time through local initiatives, is likely to maintain and even enhance long-term social relationships which make city life viable. Tipple found that most of the transformers are long-established in their neighbourhoods. They are, thus, likely to have rich networks of social, cultural and economic relationships which might be vulnerable if the area had to be redeveloped. As social cohesion is very difficult to build (Tipple, 1996).

Transformations involve the efforts of citizens in planning and implementing improvements. Faced with the enormous task of not only providing new urban areas but also of maintaining and improving currently developed areas, city authorities need all the help they can get. The now traditional way of seeking citizen participation in neighbourhood improvement takes place from the outside first; through improving the utilities and environment in a hope that the householders will improve their houses. Transformations demonstrate the reality of citizen participation in urban renewal, but done from the dwelling outwards. Although the public domain is largely unimproved by the informal character of transformations, there is potential for local authorities to complement the improvements made by upgrading the utilities and so transform the entire neighbourhood in a public-private partnership for urban renewal (Tipple, 1996).

Transformers add value to an area. The necessity of building sustainability into local authority structures has re-emphasised the need to raise sufficient profits to maintain and enhance services and staffing. One of the most popular and least troublesome means of raising revenues is through property taxes. As transformations increase the value of property in an area, they present the potential for raising property taxes. This may be particularly important when matched with the increase in demands for servicing which may follow from the population growth on site. Governments would be advised to monitor performance on revenue collection through property taxation and to view transformations as a means by which the basis of municipal revenues increases to match the increase in demand for goods and services (Tipple, 1996).

2.12 conclusion

Many subjects have been highlighted in this chapter, such as for example, many terms which could be used in the context of alterations which recognise the

phenomenon as a complex one. Moreover, no single reason is related to alteration in dwellings. Most of the studies indicated that family life cycle, income and housing deficits have a very strong correlation with transformation. Most of the studies carried out focus on types of transformations, satisfaction with dwelling space and amenities within the dwelling as well as the neighborhoods. In addition, they focus on the cost of the transformation and its process. They rarely consider it as a final result of the interaction between the man and built environment. Most of the models used to investigate this phenomenon were oriented towards different disciplines, few of which used post-occupancy evaluation to study this phenomenon. This approach is discussed in the next chapter.

Chapter Three
The approach:
Post-Occupancy Evaluation

3.0 Introduction

Every human being is affected by, and affects, the built environment where he or she lives. Houses for instance, influence a person's health, work, thoughts and emotions, sense of place and belonging. If buildings work well, they enhance people's lives, communities and culture (Baird *et al.*, 1996). Therefore, designers, planners and all who have a professional or other responsibility in shaping the built environment need to know how to evaluate buildings, places and the ways people use them.

This chapter raises some questions about evaluation, its philosophy and historical origins. It comes to focus on post occupancy evaluation (POE), the study of people's responses over the long term to their built environment. This is followed by a discussion of levels of POE research and how this differs from social research as an appraisal approach. The main objective here is understanding the interaction between people and the built environment by gathering information about the situation in its broader meaning, whether it is an architectural project or other artefact that modifies the lived environment.

The chapter charts the historical development of POE, looking at various models and uses introduced since its inception in the early 1960s. It closes by discussing criticisms of POE research as a basic philosophy appraisal, its weaknesses and strengths.

3.1 The need for evaluation

Friedmann *et al.* (1978) justify the need for POE in five ways, as follows:

- To extend the understanding of human behaviour by documenting the ongoing transaction of people and the built environment;
- To extend the design process to include evaluation and the development of feedback mechanisms for the inclusion of research data in the making of design decisions, both for fine-tuning existing environments and creating new ones;
- To provide an important body of data for use in the education of future design professionals and for use in continuing education programmes;
- To obtain the kinds of data required for the analysis of the efficacy of public polices and programmes that support and constrain the design and of range of environmental settings; and
- To develop a capability for the prediction of user satisfaction and environmental fit for environmental impact assessment in its broadest definition.

Baird *et al.* (1996) add that the benefits can be as significant and diverse as a better matching of demand and supply, improved productivity within the workplace through minimising occupancy costs and improving the knowledge base of management and design decision-making. POEs also offer an opportunity for administration, staff and residents to fully understand why specific features of the built environment were designed in a particular manner and how they were intended to function within the community (Carman & Anderzhon, 2001).

The opportunity to influence building design increases rapidly over time. Path dependency (the tendency for people to rely on already established design approaches, irrespective of their efficiency) sets in and projects become locked in to particular sets of solutions. In spite of much useful work by Habraken (1972; 1989), not enough is known about the consequence of path-dependency and how to mange it in the context of design decisions to meet changing user needs. Whyte *et al.* (2001) add that POE would appear to provide commissioning clients, design and build teams, and occupiers with a useful 'snapshot' of users' views. They add that this method needs to be repeated across several successive occasions in order to provide designers with a better understanding of use and reuse of building over a long lifecycle.

3.2 What is evaluation?

It is not the purpose of this thesis to present a comprehensive listing of definitions of POE concept, nor to argue the merits of one definition over the other but rather to consider a sampling that represents the various approaches to its conceptualisation. Many definitions seem to overlap, as their authors appreciate similar aspects of the same phenomenon but do so from a particular field. Tracing and collecting the terminology of any definition could be done by many ways historically, philosophically, or linguistically in the following section in an attempt to define *evaluation.*

Generally, the term *evaluation* as used in many disciplines is used in a myriad of contexts in people's lives. It varies from one usage to another according to specific aims and objectives. In some circumstances, it includes an activity that judges the social value or advantage of a physical phenomenon; in others, it includes extensive experiments evaluating sets under investigation.

Evaluation is the systematic collection of information about the activities, characteristics, and outcomes of a programme for use by specific people to reduce uncertainties, improve effectiveness and make decisions with regard to what those

programmes are doing and affecting. This is carried out to help people make informed choices about future programmes. The most important purpose of such evaluation is not to prove but to improve. Unlike a classical science, it does not aim for truth or certainty, but to benefit and inform programming and policymaking (Clarke *et al.*, 1999).

Leonard (1977: 16) perceives evaluation as the process of applying a scientific procedure to accumulate reliable and valid evidence on the manner and extent to which specified activities produce particular effects or outcomes. This very hard-edged approach is further developed by Rossi and Howard (1993), who explain evaluation as a method that emerged from the general acceptance of scientific methods as a means of dealing with social problems.

Many attempts have been made to define POE, for example, (Sanoff, 1994) states: A POE is an assessment process that can be applied to any type of environment. A POE is a short-term process that seeks to identify major project successes and failures. On the other hand, (Sommer, 2003) argues: evaluation is more than a list of problems and weaknesses in a building [or the built environment]. It also identifies features that are working well and appreciated by occupants. Therefore, there is no single definition that is accepted and it is more useful to consider the diverse meanings that have been put forward over the years. London, (1997) suggests that, since this discipline emerged, it has been influenced by many other disciplines which have had their own influence on the POEs. He identifies four main approaches that have evolved:

- The sociological approach;
- The rationalist approach;
- The practitioner approach; and
- The organisational approach.

These four are discussed in the following sections.

3.2.1 The sociological approach

The sociological approach emerged from the late 1960s, in line with a growing sociological attitude within the built environment community, generally academic researchers, reacting to some notable failures of the designed environment in the previous decades (Friedmann *et al.*, 1978). Within the context of environmental design evaluation (EDR), POE is considered to be:

'an appraisal of the degree to which a designed setting satisfies and supports explicit and implicit needs and values'

(Friedmann *et al.*, 1978: 9).

This definition captures the sociological and psychological influence on architectural and environmental design at the time. It also indicates an explicit attempt to remember that the primary concern of the designed setting is the satisfaction of human needs and values. One of the difficulties that rapidly arose was to uncover the criteria in the first instance, before attempting to evaluate whether a building satisfied certain criteria or not (London, 1997).

Many models were developed for defining an appropriate POE approach. For instance, the structure–process approach (which is discussed later in this chapter) was developed based on an organisation of information collected in an evaluation. This POE model derived its information from four factors:

- **The setting**: the social and physical attributes of the designed project;
- **The users**: the background, needs and behaviour of the people who are involved with the setting;
- **The proximate environment context**: the ambient qualities, land use characteristic, and neighbourhood qualities that surrounded the setting; and
- **The design activity**: the activity by the designers.

These four factors exist within a socio-historical context, which emphasise social, historical, economical and policy issues (London, 1997).

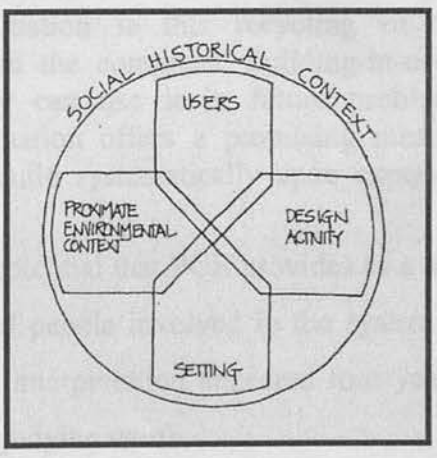


Figure 3: 1 The structure of organising information in an evaluation
(Source: Friedman, *et al*, 1978 :7)

POE concentrates on the impact of design on users. The ways in which buildings 'work' for people are only very poorly understood and need special consideration in this

context. Friedmann *et al.* (1978) suggest that POE has two major purposes: immediate feedback for a given project and the development of information for future design. In other words, it gives feedback to designers, mangers and users about how designs function in relation to their existing users' needs and suggest how building design in general might be improved.

In their study (Friedmann *et al.,* 1978), they distinguish between evaluation and social research in many ways. For instance, whereas social research strives to control extraneous factors, evaluation often just describes those factors; whereas social research is mostly concerned with discovering causes for behaviour, evaluation looks at influences on behaviour; whereas social research attempts to use causal statistical models, evaluation uses correlation models; whereas social research aims to reduce the number of factors, evaluation often examines complex systems. These differences in approach can be summarised in the notion that evaluation does not attempt to reduce complexity, but rather attempts to conceptualise it.

3.2.2 The rationalist approach

In contrast to the sociological definition's focus on building user satisfaction, the rationalist approach considers the link between POE and decision-making. Law (1981:18) stated that:

> ''Evaluation is a two-part process which involves making assessments and transmitting the findings from the assessments in a constructive form to decision-makers. An integral aspect of post-occupancy evaluation is this recycling of feeding back of information from the completed building-in-use to the decision makers so they can use it in future problem solving. Post-occupancy evaluation offers a promising means for the design professions to build systematically upon experiences to improve their product''.

This definition grasps the potential that POE provides as a decision-making tool and, in so doing extends the net of people involved in the system performance and the POE (London, 1997). A similar interpretation appeared four years later with a notably soft inclusion of the concept of judging worth:

> ''The term Project Evaluation... describes a retrospective act by which those involved can improve understanding, judgement and thereby future decision making....Evaluation can be described as a formal measuring and valuing of performance. The term valuing is of particular significance in that it refers to a process of judging worth in a given circumstance and not just an

application of a fixed external scale'' (Leslie, 1985:7).

3.2.3 The practitioner approach

In the late 1980s and within the rationalist approach, the quality movement which influenced the Western world impacted on POE the following definition, similar in many respects to others in that it focuses on the process and importance of feedforward information. It differs, however, by including that elusive word quality.

> ''POE is a careful, systematic and reliable process to determine if successful aspects of existing facilities are incorporated into new designs. It is a set of procedures used to analyse strong and weak points of existing occupied facilities and is intended to learn how well design ideas have worked in existing buildings so that the quality and performance will continue to improve'' (Macclay & Earthmann, 1991:9).

Kirk, (1989:141) stated the value engineering/value management field and described POE as:

> ''A technique used by architects or environmental researchers to determine how environments are being used by their occupants and to assess the degree to which that use satisfies VE (value engineering) and design objectives.''

London (1997) concurs with this, stating that the degree of achievement of design objective for projects compared with the actual performance of finished product, the building, is a strong theme that recurs and this definition captured this with an explicit reference to design objectives.

In the early 1980s within the field of the practitioners and authors (Preiser *et al.*, 1988:18), suggest that POE derived its name from the occupancy permit that is issued when the building is completed, inspected and deemed safe according to building codes and regulations. Thus:

> ''Post-occupancy evaluation is the process of evaluating buildings in a systematic and rigorous manner after they have been built and occupied for some time. POEs focus on building occupants and their needs, and thus they provide insights into the consequences of past design decisions and the resulting building performance.''(Preiser *et al*, 1988 :18).

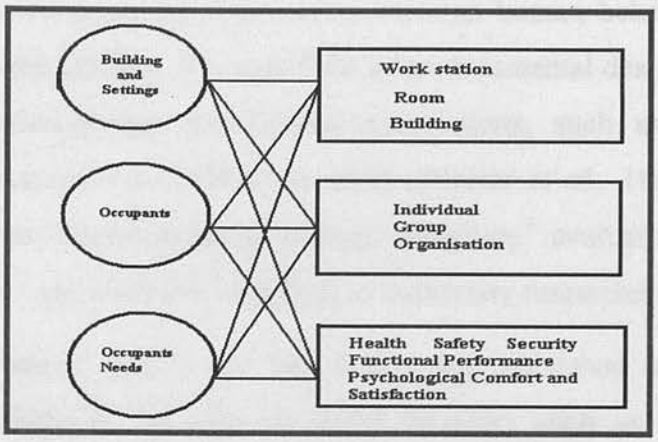


Figure 3: 2 Elements of building performance
(Source: Preiser *et al.* 1988:20)

3.2.4 The organisational approach

The emergence of the facilities management movement affected the approach to post-occupancy evaluation in giving it a role to play as a decision-making tool for organisations to manage their assets activity and carefully (Presier *et al.*, 1989; Zeisel, 1981; Shibley, 1985 London, 1997). This movement highlighted that, not only do buildings provide settings for the organisation's activities, reflect organisational structure, express organisational images and support or inhibit the realisation of organisational goals, but also, significantly, often represent the largest single physical asset.

There is an interplay between the built environment that houses organisations, the sociology of organisation itself and the building procurement process, and this is also considered by a number of writers (Markus, 1972; Zeisel, 1981; Shibley, 1985; London, 1997). The following definition was proposed with the view that post occupancy evaluation was an important tool within this large framework:

> "POE, as a set of systematic methods for evaluating the performance of facilities, can be a key tool for facilities managers to use in integrating information about facilities with other organisational concerns ... evaluation makes an important contribution to the shaping and implementation of organisational policies." (Zeisel, 1981:28)

3.3 The history of POE

In spite of the difficulty of determining the origins of evaluation research, most researchers dealing with post-occupancy evaluation, agree that, during the 1960s,

research started focusing on the relationship between human behaviour and building design. This led to the creation of a new field of environmental design research and the formation of interdisciplinary professional associations, such as the Environment Design Research Association (EDRA) in 1968. (Preiser *et al.,* 1988) state that early POE initiatives were biased towards 'college dormitory' evaluation, because of the availability of these case study environments to university researchers.

Many researches carried out in the late 1960s, and published in the early 1970s, concentrated especially in the area of health facilities such as hospitals. What is distinctive about the 1970s is the increase in the use of POEs. Perhaps the first attempt at a systematic building evaluation was made by Markus and his colleagues at BPRU.

In the 1980s, according to Behloul (1991), POE developed into a discipline of its own and that decade witnessed a number of advances in theory, method and strategy[1]. In the 1990s, there was renewed interest in POE. The UK Construction Research and Innovation Strategy Panel (CRISP) carried out a survey to find out how widely POE was being used in practice. In a survey of 160 organisations, 40% carried out no survey of any kind at the end of construction of the project. However, only 7% reported that they surveyed the building at the end of a 3-year period (Roberts, 2001). One of the main reasons for this was the lack of funding for such concerns (Jaunzens *et al*, 2001).

The most significant innovation of the 1990s was the rise of many institutes and organisations concentrating on POE. As stated on the California (DGS) POE websites; the goal of this programme was to improve DGS building and state building delivery processes. It was intended to support all stages of building delivery system, such as five-year plans, facilities plans, capital outlay budget change proposals, budget packages, and design, construction and operation (Lakney, 2001).

In their response to rethinking construction, the Royal Institute of British Architects (RIBA) practice services proposed a move towards making POE a standard service. In terms of the interaction between client and users, it was suggested that the greatest

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[1] The 1980s saw the rapid rise of related international organisations in different parts of the world, for example, the International Association for the study of people and their Physical Surrounding (IAPS) based in Europe, the People And Physical Environment Research Association (PAPER) based in Australia, new Zealand and Southeast Asia, and the Man-Environment Research Association (MERA), which was a Japanese organisation.

improvement would come through the provision of systemised feedback and in instituting post occupancy evaluation (Jaunzens *et al.*, 2001). However, counterbalancing this were fears on the part of architects that the growing use of POE techniques might increase claims against designers by clients, and hence negatively affect their professional guarantee insurance payments. Clients themselves would be unwilling to pay for what could be seen as ''putting right what should have been right in the first place'' (Jaunzens *et al.*, 2001:3).

In September 2002, 60 evaluators from developing countries and development organisations met in Beijing to found the International Development Evaluation Association or IDEA. It differs from the International Organisation for Cooperation in Evaluation in that the former is an individual membership organisation intended to provide professional connectivity and mutual support among evaluators working on development issues, whereas the latter is an assembly of national and regional evaluation organisations designed to promote communications, professional development and the pursuit of common goals by member organisations (Piccioto, 2003).

3.3.1 Charting POE

A review of literature reveals that there are many studies that have made a significant contribution to the development of the POE approach in both theory and application. Therefore and as suggested by London (1997), it is possible to identify six major influencing disciplines and trace the development of POE.

- Psychological: The human behaviouralist researchers who pioneered environmental design research in the 1960s in specific functional and behavioural aspects, relate to the individual's perception of the environment;
- Sociological: Human behaviouralist researchers who focus on social evaluation functioning and behaviour, however, relate evaluation to the reaction of large groups in the environment;
- Multidisciplinary: The performance concept researchers whose models and studies took their roots from a holistic, multidisciplinary systems approach;
- Organisational: The facilities management movement focused on organisational issues;

- Technical: The building diagnosticians who focused on performance specification and technical measurement; and
- Educational: New invitations arose to adapt evaluation in architectural education with new methodological approaches.

Figure 3: 3 charts some of the significant POE events and models, in the process of developing POE, many disciplines were used and many investigations were carried out for at least half a century but the results are not encouraging. Doidge (2001), claims that most POE inquiries take the form of 'internal enquiries', either to 'whitewash' or to 'assign blame', and are rarely published. He calls for professionalism, by means of

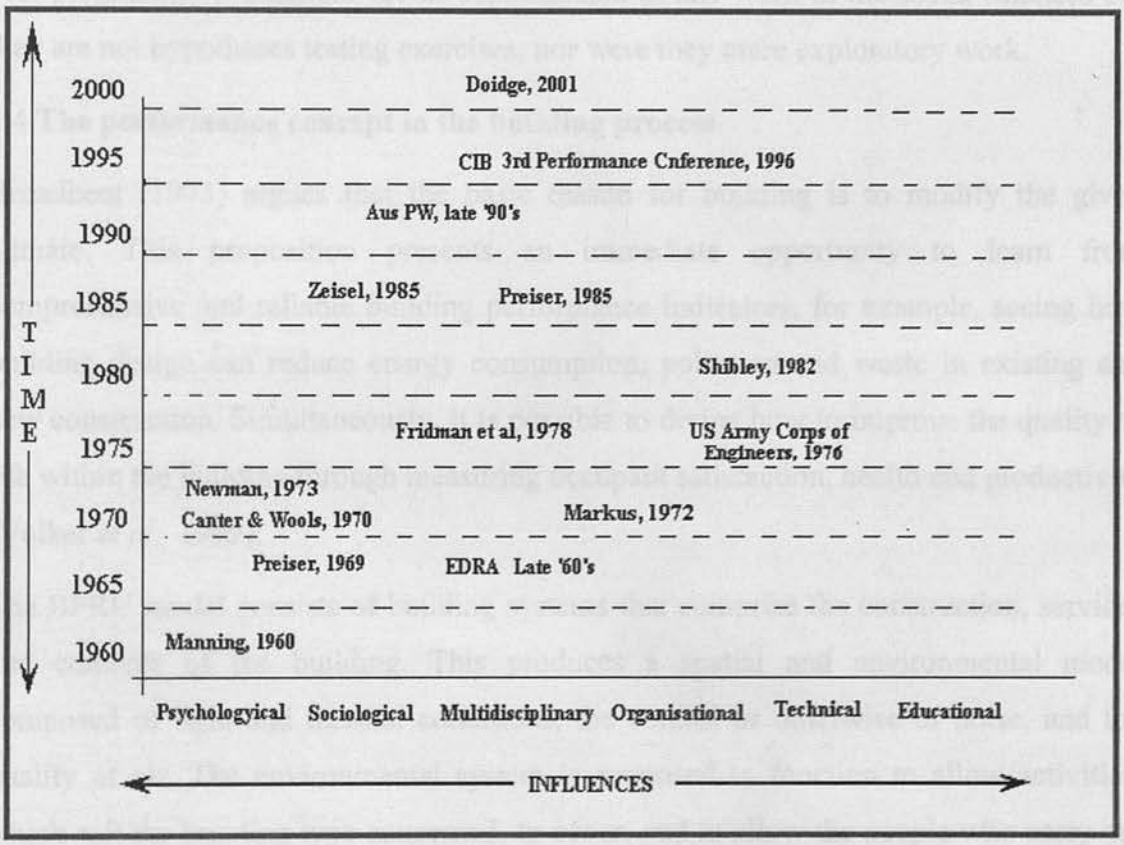

Figure 3: 3 Major influences from 1960-2001 (cited form London, 1997:30) and modified by the author

Encouraging institutions to apply the approach that has been used by CUDE[2] (Client and Users in Design Education).

[2] CUDE – Client and Users in Design Education: A project that grew out of the construction industry's concern about its relationship with clients and users. The University of Sheffield and De Montfort University, with funding from (HEFCE) joined forces to examine relationship both amongst the constituent professions and with clients and users.

Scriven (2001) states that evaluation, as a transdisciplinary activity, services not only the social sciences but also history, geography, computer technology, education, business and management, accounting and older science such as physics and biology. In his article, Scriven invites educational institutions to adapt evaluation as a discipline in undergraduate education systems, explaining that a major change in the conception of general education or a liberal arts degree needs to be brought up to speed with the emergence of this new discipline. He proposes that other long-overdue and related changes can and should also be coordinated with this: the need to replace traditional logic with a new discipline of informal logic and the need to break the mould of the hypothesis-testing model as the paradigm of research work in the social sciences. The best programme evaluations are as sophisticated as any work in the social sciences but they are not hypotheses testing exercises, nor were they mere exploratory work.

3.4 The performance concept in the building process

Broadbent (1973) argues that the basic reason for building is to modify the given climate. This proposition presents an immediate opportunity to learn from comprehensive and reliable building performance indicators, for example, seeing how building design can reduce energy consumption, pollution and waste in existing and new construction. Simultaneously, it is possible to divine how to improve the quality of life within the building through measuring occupant satisfaction, health and productivity (Volker *et al.,* 1999).

The BPRU model consists of building systems that comprise the construction, services and contents of the building. This produces a spatial and environmental model composed of light and thermal conditions, the control or otherwise of noise, and the quality of air. The environmental system is supposed to function to allow activities, which suit the building type concerned, to occur, and to allow the people who carry out these activities to do so free of unnecessary environmental stresses. This, the BPRU calls the activity system (Figure 3: 4), and it is this which satisfies the objectives of the client association that originally wanted the building.

The activity system extends beyond objective environmental criteria to include production for working environments and the morale of people who live, work or study in the buildings appropriate for the activities involved. Across these four systems is connected the resource system which include the costs of providing the building (Markus *et al.*, 1972).

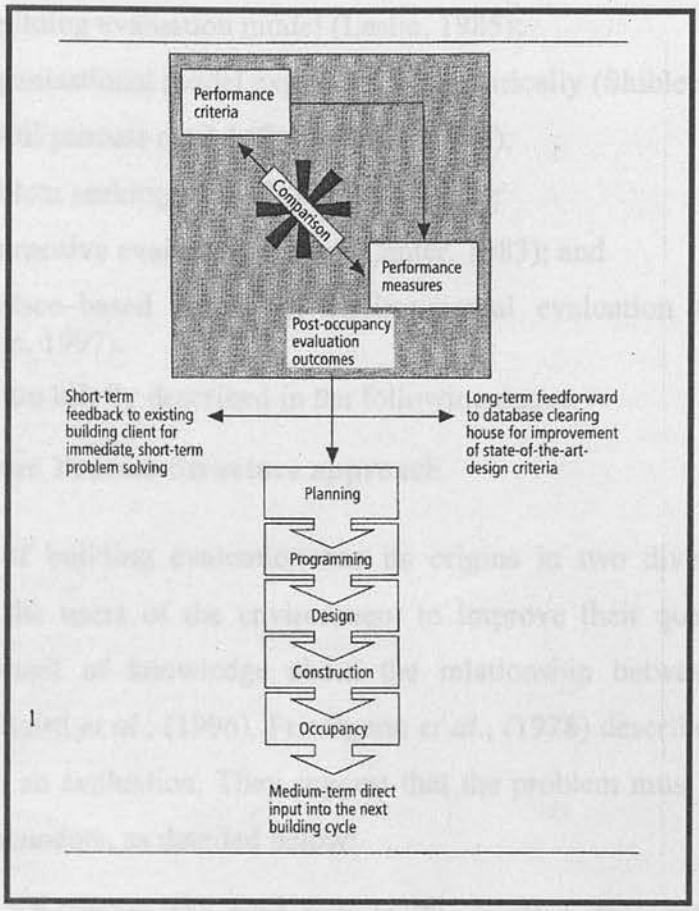

Figure 3: 4 The Performance Concept in the Building Process
(Source: Preiser, 1989, Building Evolution :21)

This model was radical for its time. However, researchers and practitioners now believe that real life situations are much more complex in relation to the users (Thorne, 1987).

3.5 Evaluation models

Various POE models have been produced by scholars. This section highlights the main principles of these models, in order to understand their positive and negative aspects to help formulate an evaluation model for this research.

Behloul (1990) distinguishes various models of POE under two broad categories The first, descriptions of the process of evaluation is called the ''structure process'' approach to evaluation, which was introduced by Friedmann *et al.*, 1978. The second is the descriptive model of psychological phenomena. London (1997), suggests that the models that have arisen over the years, and which might be considered under the system approach, are:

- The process-structure model (Friedmann *et al*, 1978);
- The BPRU model (Markus, 1972);

- The building evaluation model (Leslie, 1985);
- An organisational model explained metaphorically (Shibley, 1985);
- The POE process model (Preiser *et al*, 1988);
- A problem seeking method (Parshall, 1989);
- The purposive evaluation model (Canter, 1983); and
- The place–based theory of environmental evaluation (Norton and Hannon, 1997).

These models are briefly described in the following pages.

3.5.1 Friedmann Process-Structure approach

The practice of building evaluation has its origins in two divergent traditions: the advocacy for the users of the environment to improve their quality of life; and the systematic pursuit of knowledge about the relationship between people and their environment. Baird *et al.*, (1996), Friedmann *et al.*, (1978) describe a multistep process for doing such an evaluation. They suggest that the problem must first be described in terms of five elements; as detailed below:

- **The user**: The term user in this context does not only include the people who work or live in the building, but all people affected by the building. This, therefore, covers those involved in the normal activities housed by the building, and takes into account their backgrounds, preferences, behaviour and needs. In many cases, the major problem in an evaluation is defining the user group;
- **The building**: This term includes such typical architectural considerations as size, cost and material as well as a description of other qualities important to users, for instance, levels of auditory and visual privacy;
- **The social–historical context:** This term describes the broad forces that have influenced the building design. It includes, for instance, societal pressures to create an energy efficient structure or the increasing demands for housing for the elderly; and
- **The design process**: This refers to the sequence of steps through which architects and other professionals proceed in order to produce a habitable building. In the design process there are many other participants like client, users, bankers and psychologists. The information realised through POEs of previous design experiences enhances the knowledge base of all decisions made through this process.

Another important factor that impinges on design activity is that of planning requirements. These consist of many directives, limitations and criteria that influence the form of the designed environment and can include, for instance, legislation, policies, and administrative guidelines in public housing and open space programmes (Behloul 1991). Furthermore:

> ''POE takes into account the neighbourhood, focusing on how well the building fits in its physical context and on how the building is affected by its surroundings. Therefore, the neighbourhood is examined from an aesthetical viewpoint, assessing the balance between building and its surroundings, and also from a social viewpoint; looking at how the building affects the neighbourhood's and self-image'' (Zimring & Reizenstein, 1981: 54).

Many investigations were carried out adapting this model as a guideline to investigating the relationship between people and the built environment. London (1997) states that of the fifteen studies reported to support the model, nine were actually able to provide some sort of insight into the design objectives. All studies where project objectives were captured were done so retrospectively and the initial information was obtained through individual interviews with architects who had worked on the project, or documentary evidence. Of these nine studies, three had involved users in the early design decision-making process in varying ways and with varying degrees of success. London added that one of these three evaluations was carried out on student accommodation and involved the main user group, the students in this case, through a series of questionnaires. The consultation and monitoring appeared quite extensive as the questionnaire was administered throughout the entire procurement process. However, the students were generally unhappy with the consultative process and the design, and were of the opinion that the 'experts' were making the decisions anyway.

3.5.2 The BPRU model

In the 1960s the Building Performance Research Unit at the University of Strathclyde, Scotland devised a model based on the system approach. This model is structured around four interacting systems (Figure 3:5).

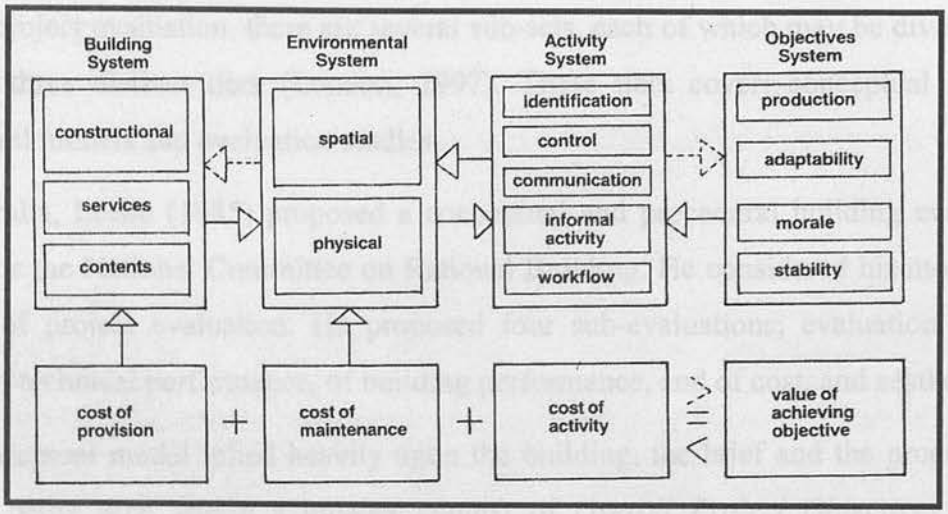

Figure 3: 5 The Building Environment Activity System: a Conceptual Model (Source: Markus, 1972 : 1576)

In this model, the building system consists of all the sub-systems, assemblies and components of which a building is constructed. There are four main sub-systems:

- Systems: constructional, services, contents.
- The environment, spatial and physical, generated by the building system and the activity of the occupants.
- Activity and behaviour of the occupants, which is affected by and affects the environment.
- Objectives of the organisation to which the occupants belong and which has decided to put up the building (Markus, 1972).

The four systems are supported by a cost system, each of the systems has a cost effect.

London (1997) states that one of the important aspects of this model was the exploration of the dynamic interface between the building as a lifeless system and the building users as an animate system. London (1997) argues that this leads to the perception that although the building system is inert, it is also temporary and dynamic in its own right. Hence, the completion and handover of a building is an intermediate stage, and not an endpoint, an event in the life cycle of the building's environment. As changes occur within the organisation's system, they require ongoing changes to the building system. This model is distinctive in that it grasps the essence of the facilities management movement when it was in its early stages and, in the viewpoint of the author, the model is still relevant today.

3.5.3 Building evaluation model

Project evaluation is assumed to include building work, processes, procedures, communications and decisions, which in combination, achieve the building project.

Within project evaluation, there are several sub-sets, each of which may be divided into at least three distinct tiers (London, 1997). These tiers cover: conceptual models, procedural models and evaluation studies.

In Australia, Leslie (1985) proposed a conceptual and procedural building evaluation model for the National Committee on Rational Building. He considered his model as a sub-set of project evaluation. He proposed four sub-evaluations; evaluation of user needs, of technical performance, of building performance, and of cost, and aesthetics.

The conceptual model relied heavily upon the building, the brief and the procurement process being seen within a broader context of *Overall Project Objectives.* It was suggested that objectives are rarely stated and, as a result, it is frequently assumed that all team members have a common set of goals. London (1997) observed that, in reality, however, objectives differ with the individual, their backgrounds, interests and responsibilities within the project team and, frequently, can be the source of unnecessary misunderstanding and conflict.

The model, however, does include both the physical building systems and the human activities that are accommodated, and draws attention to the fact that these interact on both a qualitative and a quantitative basis. Within Projected Performance, the two parts are: building systems and human activities; corresponding within Achieved Performance, the two parts are: building systems and human responses. The model identifies three streams of evaluation: the brief, the product (the building works) and the process of procurement, for although not strictly a part of the evaluation procedure, it was noted that the model is not complete without incorporating the effective management of information from the evaluation and therefore, includes a 'Findings' component. The main path for information flow includes a databank which provides feedback into the various phases of future projects (London, 1997).

3.5.4 Shibley's Chess model

In contrast to the formal approach of the previous models, Shibley (1985) initiates a unique analogy to a chess game to highlight that the purpose and effectiveness of an evaluation is guided by its sponsorship of the client organisation. The model explores the idea of building evaluations being a 'participatory' exercise involving collaboration with the organisation occupying the building and the evaluators.

The aim is for the POE to become an internalised issue in contrast to many past POEs that were imposed on institutions and performed by 'experts' and which were largely an externalised issue. It was in exploring this theme that the chess analogy was proposed and is repeated here exactly.

> ''Imagine, if you will, a group of post-occupancy evaluators analysing the game of chess. Thus far in their studies they have employed the standard tools of their trade and find, for example, that in a hundred observations of the movement in a diagonal direction, it always captures a piece belonging to the opposite player. Being inquisitive by nature, the scientists wonder why this destructive behaviour occurs and begin to study the phenomenon in depth. They examine the materials of the board, the weight of the pieces, the magnetic properties of the pawn, the geometry of the pawns and other elements of the board, and the temperature of the rooms. None of this, of course, tells them anything about why when the pawn moves in a diagonal direction it always captures a piece belonging to the opposite player'' (Shibley, 1985: 95).

This is making a particularly emotional comment against the value of the many purely technical evaluations conducted in isolation. Shibley adds to the game metaphor by explaining that the 'truth' is clear to the chess player.

> ''The rules of the game govern the behaviour of the pawn. The rules in the example are explicit and understood by all the players in the game. It is indeed unfortunate that our team of evaluators do not play chess and do not know the rules'' (Shibley, 1985: 62).

The post occupancy evaluation in this context is placed within facilities management and acknowledges that to evaluate or put value on a facility is central to its management (London, 1997). If the goal for POEs is for the processes of inquiry to be incorporated by an organisation, the overall approach advocated in this model has to reconcile two opposing trends, as follows:

- Evaluation needs to be simple but
- It needs to reflect an understanding of the complex rewards systems within an organisation.

The first evaluation may only need to be very simple. An increased complexity can be introduced over time as needs order and as individuals learn firsthand both about how to conduct the research and about how much economic and social return can be expected from the inquiry. Organisations need not choose complicated or sophisticated methods but allow the process of inquiry to be clear to occupants/building managers and that they will be less able to continue after the evaluation experts leave.

A knowledge of the complex rewards systems internal to organisations is essential to reveal who benefits from: the repair of the environment, the improvement of the repair

process, the improvement of the individual and organisational health of building occupants, and new ideas in construction, design, cost and scheduling (London, 1997).

3.5.5 Ecological perspective

This conceptual model, suggested by Lawrence, (1991), claims that, to produce a good building design, professionals should understand the relationship between design and the environment and it should be understood in the context of ecology, this includes:

- A bio-logic, or the orders of biological organism;
- An eco-logic, or the orders of inorganic constituents (e.g. water, air, soil and sun); and
- A human-logic or the ordering of cultural, societal and individual human factors (Lawrence, 1991: 31).

Lawrence (1991) defines human ecology as the holistic, integrative perspective of those processes, products, orders and mediating factors that regulate natural and human ecosystems at all scales of the earth's surface and atmosphere. Many scales can be incorporated into this approach, for example, the AIA (American Institute of Architects) introduced seven scales to understand any phenomenon connected to the human-environment interaction, which includes twelve levels of ascending size. These are:

1. The individual
2. The home
3. The street
4. The neighbourhood
5. The area
6. The city
7. The metropolitan area
8. The region
9. The nation
10. The continent
11. The world
12. The solar system (Lyle, 1999: 40).

On the level of practical implementation of the ecological perspective, Lawrence (1991) recommended that environmental design evaluation of a human ecology should bear in mind the following principles:

First, interrelations between humans and the components of their surroundings. These are manifested through a wide range of physiological and psychological processes. including sensations and perceptions, beliefs, principles, ideas and representations. These are uniquely human and non-observable. The suggestion here is that interrelations between people and their environment are not necessarily spatial, nor observable, but

cultural and metaphysical; nor are such interrelations absolute, or static, but subject to change during relatively short and long periods of time.

Second: the interrelations between human beings are characterised by discursive and reflexive knowledge. In other words, it is important to recognise the role of symbols, particularly linguistic symbols. This characteristic is a distinguishing feature of human behaviour; it has important implications with respect to human interpretations of the landscape and the environment.

Third, the 'human environment' can be distinguished from that of other organisms by its instrumental nature. Human products and processes transform constituents of the environment in order to respond to prescribed aspirations, needs and goals. These in turn, are defined by both individuals and human groups, in relation to a wide range of purposes. And thus are related to value*s* which are variable between different groups of people in the same society, and perhaps for individuals during their life-cycle. As a result, it is necessary to examine whose values and intentions should be accounted for with respect to environmental policies and practices in a precise situation.

3.5.6 The process model

This model introduced by Preiser *et al.*, (1989) it is a procedural model that outlines specific steps for evaluations that can be applied to any type or size of building or facility and regulates the evaluation effort in terms of time and resources. This model was driven by methods used rather than theory, although supports the building performance concept. The evaluation method in this model is directed by two dimensions: level of effort and major phases. There are three levels of effort:

- ***The indicative level.*** In this basic level of POE the evaluation is carried out within a very short time span using minimal resources to indicate major failures and successes of an architectural project;
- ***The investigative level.*** This level of the POE is more time consuming, more complicated and requires more resources. Often an investigative POE is carried out when an indicative POE has identified issues that require further investigation; and
- ***The diagnostic level.*** This third level of POE is a comprehensive research conducted at a higher level of effort. It differs from an investigative POE, as Behloul (1991) suggests, in three ways. First, a

diagnostic POE uses a multi-method approach in data collection, which includes questionnaires, surveys and physical measurements. Second, it uses more extensive data collection and complicated analysis techniques. Third, because diagnostic POEs are usually large-scale projects, involving many variables, the attempt is often made to develop results that indicate relationships between the variables.

According to Noel (1980), there are four different bases for evaluating buildings:

- Original purpose for which the building was designed or the purpose it currently serves;
- The process by which the building was built;
- The building itself (including physical performance of the parts, the effects of this on human performance and the effect of human performance on the building); and
- The operation and maintenance of buildings (including administration, upkeep and costs-in-use).

The four generic categories mentioned above can serve in developing a conceptual framework based upon which an effective evaluation method can be made. Once this has been determined, it becomes possible to identify the particular performance indicators for which each measurement is to be made. Finally, once the decision concerning the performance indicators to be measured has been made, a decision is needed on how the measurements are to be interpreted and how the results can be disseminated.

Another strategic dimension to be considered during planning an evaluation is whether the motivation for evaluation is internal or external, a decision that can shape the role of the organisation doing the evaluation. Baird *et al.*, (1996) define internal evaluation by its desire to have the answers now as distinct to later, whereas external evaluation is directed to knowledge that can be applied generally to many buildings and assists with decisions about buildings other than those used to gain the knowledge. If the motivation of evaluation is 'to enable place making', then the practice must focus on the place and the people in that place. The most important activity of place makers would be to create the opportunity for dialogue about the place and place making through the development of relationships among the various groups that occupy it. Then it can focus on the concrete experience of place as it has been made and experienced over time by the various inhabitants (Shipley *et al.*, 1996).

3.5.7 Problem seeking model

Parshall (1989) introduced the problem-seeking model, in a case study of a hospital evaluation in the United States. The models' problem-seeking method was carried out in a sequence of five steps:

- Establishing the purpose of the building;
- Collecting and analysing quantitative information of building performance;
- Identifying and examining qualitative information of building performance;
- Making an assessment; and
- Stating the results and lessons learned.

Undertaking each step should be done with the four following main considerations:

- Function;
- Form;
- Economy; and
- Time.

The purpose of the POE was put together in three parts: to provide a basis for updating the master plan; to learn lessons from the new and renovated facilities that might relate to the programming and design of future renovations or additions; and to fine-tune the recent completed facilities, (London, 1997).

3.5.8 Purposive evaluation model

The fact that the built environment is used and experienced rather than simply observed, implies that people have a purpose for being in any given location and their plans and intentions must consequently play a role in any understanding of psychological implication of the environment. This led Canter (1983) to propose a preliminary model for environmental evaluation drawn from a phenomenological perspective of the nature of environmental evaluation.

The central proposition of the model suggested by Canter is that the fundamental processes underlying human experiences of places are consistent across people and places. He adds that the physical component of human experience of place usually has two identifiable aspects: the first relates directly to the spatial component, with all its connotation of demarcation and privacy, the second relates to the services and comfort that a place provides. The model accepts the premise that human interaction in a

building is constructed from expectation based on the purpose to which each space is intended to serve. This model is discussed further in Chapter Four of this research.

3.5.9 The place–based theory of environmental evaluation

A place-based theory of environmental evaluation is introduced by Norton and Hannon (1997). This theory refers specifically to domestic building, although it offers implications for other building types. It rests on the assumption that some form of territoriality is universal to all human cultures, particularly with respect to those aspects of culture that relate people and communities to their ecological, social and cultural contexts. According to the theory, environmental values are manifestations of cultural values constructed from a given perspective in time and space, in which the intensity of environmental valuation is highest in the here and now and is discounted from the home perspective across both time and space. This theory is an extension of the general concept of geographical discounting (Hannon, 1994), wherein people, animals and plants seem to consistently prefer to distance themselves from objects they fear and draw close to things they desire. The place-based theory of environmental values leads to two general hypotheses:

- A scientific hypothesis relating the physical distance of an object from the home to intensity of value-judgements; and
- A social-scientific hypothesis that allows researchers not only to predict how people will value things, but also to measure changes in local preferences as a result of experiences in the social formulation of management goals (Norton & Hannon, 1997: 231).

These hypotheses assume that environmental values are formed within a phenomeno-logical space that is organised from some place, and that the development of a full sense of place involves a recognition of the various scales on which one interacts with nature from that place. Accordingly, local values that are associated with a particular place are forged out of a very intimate relationship with the local ecology, and their perpetuation is associated by local inhabitants with success in maintaining their sense of spiritual and physical place' (Norton & Hannon, 1997: 238).

It is clear, then, that the recent decades have thrown up an array of POE approaches, each with its own benefits. They generally spring from differing ideas, as to what are the effects a building has, and therefore how wide the researcher needs to cast his/her

net in terms of time (relating to construction process of the building and its long-term performance); space (relating to its urban and ecological context); administration (relating to its budgetary and management factors); and cultural consequence (relating to theories of space, cultural value and meaning). Each of these in turn implies a research attitude ranging from empirical indicators of building performance and cost to subjective indicators of user (and neighbour) satisfaction. The sheer number of approaches also implies that, as the field of POE is relatively new, and the building types it seeks to examine diverse, many researchers have chosen to develop methodologies specifically suited to their research projects.

As the current research deals primarily with changes that residents make to publicly-supplied housing, the author recognises that facts related to the construction process are side-issues to this research's aims, although they are not entirely irrelevant. Instead, issues related to user satisfaction, space experience, and cultural needs occupy the centre-ground of concerns. These aspects, are discussed further in Chapter Four.

3.6.0 POEs and the Design process

Post occupancy evaluations, focus primarily on the impacts of designs on users. This is not to imply that evaluations of other aspects of design are not critically important: aesthetics, energy performance, maintenance and the workings of structural, electrical and mechanical systems. Some evaluations take a multidisciplinary approach. In addition it has two major purposes: immediate feedback for a given project and development of information for future designs. POEs give feedback to designers, managers and users about how designs function in relation to users' needs and suggest how buildings might be improved (Zimring, 1981).

In Zeisel's model (1984), he suggest seven steps of evaluation, these are: decision to build, programming (setting goals and constraints), designing, constructing, using and adaptation, and evaluation (by means of feedback to modify the building or to assist in future design). It is obvious that the main feature of this model is its cyclical nature.

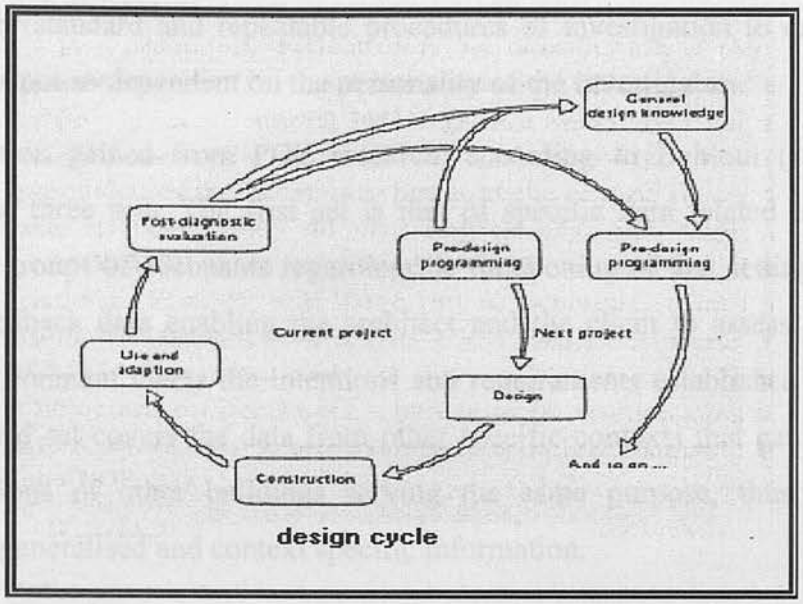

Figure 3: 6 Evaluation and design
(Source: Zeisel 1975: 20)

3.7 POE and Architectural Criticism

POE can be understood more clearly if compared to something more familiar and with a much longer tradition: architectural criticism. As Zimiring *et al.,* (1982) suggest, in some ways POE and criticism are very similar, in other ways very different. Both evaluation and criticism look at the historical context of a building and try to place it in the longer history of architecture. Both look at the circumstances that led to the building being built the way it was, and may concentrate on similar issues such as circulation, image or appropriateness for the local context. Neither is inherently 'good' or 'bad'; though there are good and bad examples of each. There are, however, some fundamental differences between criticism and POE. They come from different traditions and serve different purposes. Criticism is, by its nature, subjective; it is the building seen from the critic's viewpoint. Evaluations use systematic methods of investigation to gain a valid picture of the users' views of the building. Traditional architectural criticism has, as its main foci, aesthetics, the quality of the design and its place in the history of artistic ideas and concepts.

A fundamental difference between criticism and POE is the process by which conclusions are reached. The architectural critic may visit the site, examine photographs and/or look at other buildings by the same designer. The method depends on the individual approach of the critic. The results of this examination may or may not yield artistically valid insights about the work itself, describe a historical milieu in which the design was conceived and identify significant flaws in the execution. In contrast, POE

uses relatively standard and repeatable procedures of investigation to ensure that the information is not so dependent on the personality of the investigator.

The information gained from POE research, according to Behloul (1991), can be classified into three sets. The first set is that of specific data related to a particular building and groups of occupants regarding the functioning of that setting. The second set is the feedback data enabling the architect and the client to assess how well the designed environment meets the intentions and requirements established in the design brief. The third set covers the data from other specific contexts that can be compared with evaluations of other buildings serving the same purpose, thus enabling the formation of generalised and context specific information.

In the case of feedback data, evaluation research is generally applied to an existing building, that has somehow not 'worked'. The researcher is invited to discover the causes and to suggest a solution to a particular set of problems. POE can thus be fed back into future projects in such a way that it can be considered as a 'diagnosis', the applied use of the results being a form of treatment. In addition, POE can be used to feed-in information to a project when the evaluation research is conducted especially for a building that is not yet built and is still under design. Feed-forward, in this case, the results of studies of one building are applied to the construction of another building. It is with the notion of feed-forward that the majority of problems found in evaluation research utilisation can be solved.

3.8 Critical issues in evaluation

Friedman *at el.,* (1978), state that sampling and reliability are critical issues in evaluation. In general, the former is discussed in terms of four issues: general distinctions between opportunity sampling and random sampling. The sample may not represent a large group. In random sampling, the evaluator identifies the participants on a chance basis.

Friedman *et al* (1978) and Thorne (1987) mention that reliability is the second term of criticism which means if the evaluation data are to be useful, they must be satisfied in at least two ways. Firstly, assurance should be given that the way activities are recorded is not entirely dependent on the particular evaluator doing the recording; secondly, data should show some stability across time, where the stability depends in part on the methods used and the activities observed as well.

Another problem in evaluation research stated by Zeisel (1984) is how to reconstruct design decisions. Investigators can better use evaluation research results to improve the process of making design decisions in future if they can identify and make visible the design decision that led up to the setting being evaluated.

3.9 Changes in dwellings and POE research

As a phenomenon, changes and modifications in dwellings happen in many countries, especially in third world countries. They might signal as an adaptation of the human being to the built environment, or be a natural process, whose necessity derives from many reasons. Whatever the reasons behind these changes and modifications they present an opportunity to those people concerned with built environment to investigate and study how people have responded to their architectural contexts. As a phenomenon, physical changes to the dwellings offer a host of advantages that overcome many of concerns raised in different subjects architecture, anthropology, and economy. This indicates the importance of investigating such phenomenon.

This research is an attempt to integrate POE as a research approach and the phenomenon of the alterations that people have made to their homes for many other reasons. Firstly, there are few studies that show concern about integrating these fields. This invites the researcher to explore a relatively unknown research direction in order to contribute his experience to the emerging discourse. Secondly, the author believes the topic of change after use merits much study to predict users' attitudes and the interaction between residents and their dwelling. He suggests that the approach of POE offers an ideal vehicle for conducting such studies.

3.10 Conclusion

POE research covers investigations carried out on situations in the built environment which have been completed and under use. The main objective is gaining knowledge about the situation and how it meets the users' needs. There are no fixed ways to carry out the POE research. Any researcher dealing with POE must give attention to the context of the situation being evaluated from many points of view, for instance, the history of the building, its way of construction, its people, the neighbourhood, any environmental or ecological inputs, and the theoretical measurement of the phenomenon being studied.

There have been a number of POEs conducted, but little contribution has been made to develop the theoretical development of the field. The history of POE in the UK shows that most of the investigations were oriented toward improving the performance of the building from the viewpoint of technical comfort; little has been done to respond to more philosophical issues of spatial experience and how users change and modify their buildings specifically, (their dwellings). In addition, most of the POE studies limited their investigations to technical failures of the building and POE was rarely used as a tool to investigate and improve the general policy of housing or the social context of the dwelling.

Introduction to Part Two

In the previous phase, three themes were explored, they formulated the general understanding of the Libyan context, the phenomenon of dwelling alterations and the POE approach. They work as a preparation for the second phase of this thesis, the planning and conducting phase, which consist of three chapters. Chapter Four discusses the research design and methodology, the philosophical assumptions behind the two paradigms quantitative and qualitative approaches, followed by a review of the models used to study the built environment, then the factors which will be used in the current research are introduced.

In Chapter Five data collection techniques were established, followed by question types used and their scales as well as data analysis suggested such as SPAA and space syntax theory.

In Chapter Six, data collected in the survey was analysed and a comparison between the original plan and modified plan has been undertaken to formulate the finding of the research.

Chapter Four : Research Design and Methodology

A good methodology is more a critical design attitude to be found always at work throughout a study, rather than confined within a brief chapter called 'methodology'

(Peter Clough & Cathy Nutbrown, 2002: 31)

4.0 Introduction

This chapter describes the methodological approach adopted for the current research. It starts by discussing the philosophical assumptions behind the two paradigms of quantitative and qualitative methodological approaches in order to identify some appropriate methodological guidelines for an effective evaluation research programme. It sets out to explain the definitional framework for the study and proceeds to highlight models used to investigate the users' experiences of place. Finally, it states the factors which are addressed in the survey to evaluate the interaction of the owners and occupiers with their homes.

Generally, these factors are not oriented towards discovering the relationship in terms of cause and effect. Instead, they are formulated to investigate the situation in a country like Libya and are therefore intended merely to shed light on the phenomenon of occupier-made changes to the dwelling.

4.1 Research process

There are many ways to plan and conduct an evaluation of a building. The examples discussed in Chapter Three reveal many possibilities for using evaluation as a tool in search of both better building guidelines and to establish greater knowledge of the relationships between building users and providers. Gray *et al.*, (1996) distinguish four phases for evaluation research: ***initiate***, ***plan***, ***execute*** and ***use***.

This blueprint, however, is better suited to situations where the researcher has been invited by building contractors or users to investigate a particular set of buildings. Academic research, however, is more focused on general patterns and principles, and uses the survey as a springboard to highlight these issues.

In this research, the evaluation is divided into three main phases. Phase one includes the three previous chapters (Figure 4:1). It focuses on understanding and highlighting the context of Libya, the phenomenon under consideration, the literature review and the range of the methodological approaches which can be used. The second phase (Figure 4: 2), involves designing the POE model and the factors that are to be

measured to evaluate the dwelling alterations, as well as data analysis and its interpretation. The last phase is followed by three chapters goes beyond the typical evaluation research where the researcher submit the finding.

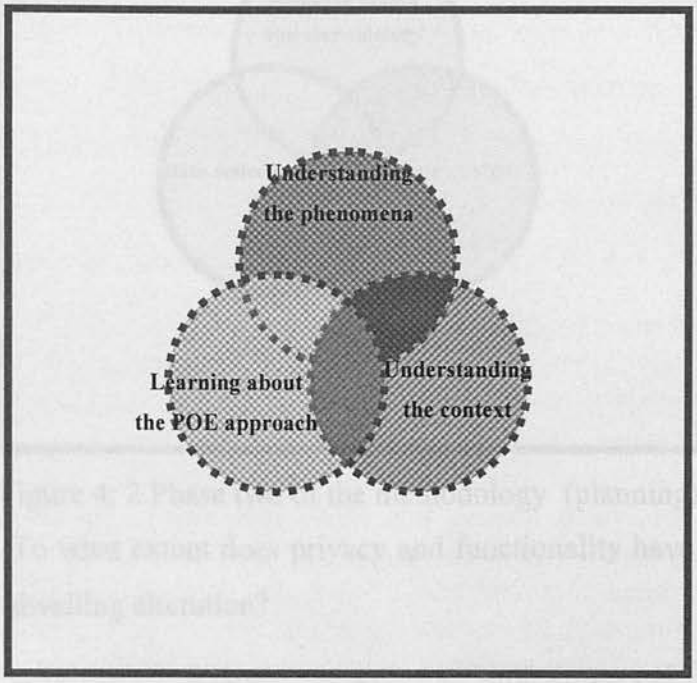

Figure 4:1 Phase one of the methodology (initiation phase)

4.2 Research questions

The general issue to be investigated in this research is that of the alterations to Libyan public housing which have been carried out by the owners. It is assumed that these changes are influenced by the users' housing experiences, their image of an ideal home, their satisfaction with the attributes of the current dwelling, as well as their satisfaction with the neighbourhood and the demographic characteristics of the occupiers. Before explaining the methodology adopted in this research, it is important to consider the research questions that were addressed at the outset of the thesis and to review them in greater detail to help to determine an appropriate methodological approach.

- Why do Libyan public housing users alter their dwellings?
- To what extent do users housing experiences have an influence on alterations and changes to the dwellings? Owners' experience encompasses variables such as their previous and current housing environment, which includes features such as the layout and number of rooms in their previous house. Their evaluation of the attributes of the previous and current house.

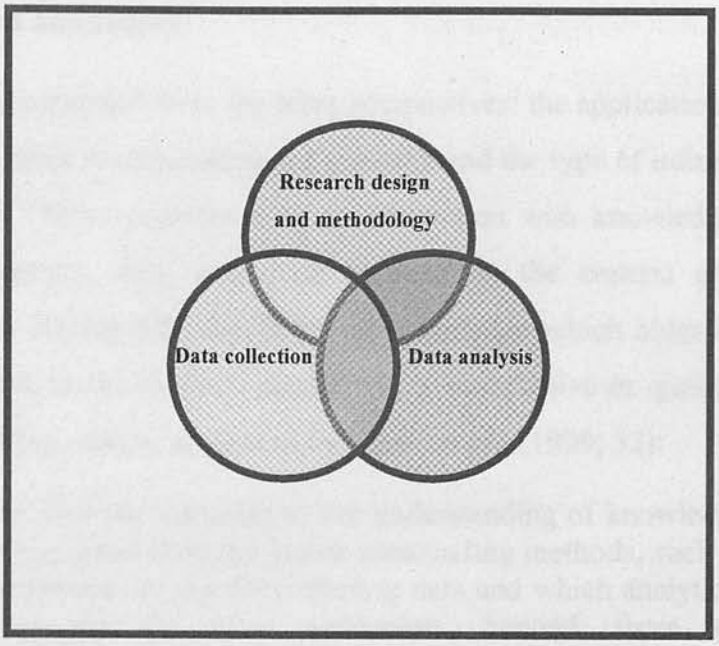

Figure 4: 2 Phase two of the methodology (planning)

- To what extent does privacy and functionality have an influence on dwelling alteration?

- To what extent does satisfaction or dissatisfaction with the existing attributes of space within the house influence the dwelling alterations? Space attributes may include the position of spaces to each other and the area of space.

To the author's knowledge, the phenomenon of dwellings, alteration in Libya has not been investigated, therefore there is no clear evidence to date about it, and no variables have been identified which could be considered as key factors. At the same time, as has been explained in Chapter One, Libyan society is in transition and this includes widespread modernisation of housing stock, to which the users need to adapt. This situation necessarily raises the question as to which dwellings are open to modification. These forementioned questions form a basis from which the author can seek to understand and map the issue clearly. They also recognise that POE differs from other kinds of research in its all-inclusiveness. It evaluates all aspects of the environment, from lighting and acoustics to privacy, suitability and performance rather than focusing on one particular aspect.

4.3 Information and reality[1]

Research can be classified from the three perspectives: the application of the research study, the objectives in undertaking the research and the type of information required (Kumar, 1999). Others consider it as an interaction with knowledge. Clark *et al.*, (1999), for example, view evaluation research in the context of the academic environment, as dealing with the theory of knowledge which hides epistemological debate as to whether the research should take a quantitative or qualitative approach. Generally speaking, and as suggested by Clark. *et al.*, (1999; 32):

> There are four key elements to our understanding of knowledge construction. First there are issues surrounding methods, such as which techniques to use for collecting data and which analytical procedures are the most appropriate. Second, there are considerations of general methodology, which relate to the overall logic of inquiry and cover the general principles by which research tools and techniques are applied... third, there are questions of ontology which are concerned with being and the nature of reality. Finally, there are matters of epistemology which are concerned with questions of knowing and the nature and limits of knowledge. While the first two key elements address the practicalities of knowledge construction, the latter two concentrate on the philosophical assumptions underlying research practice.
>
> (Clark, *et al* 1999: 32)

In short, research can be divided into quantitative and qualitative approaches. These two approaches are discussed briefly in the next few pages.

4.3.1 The quantitative[2] approach

With a quantitative approach, the primary objective evaluation research is not the discovery of new knowledge but rather the study of the effectiveness with which existing knowledge is used to inform and guide practical action (Clarke *et al.*, 1999). Within the epistemological debate, the quantitative approach is the application of a scientific approach to the study of people, either individually or within groups, as well as to incorporating the idea of causality, which lies at the heart of all policy evaluation. In other words, the quantitative approach seeks to establish whether or

---

[1] Researchers in the philosophy of science distinguish between realism and idealism: **Realism** is the view that the world has an existence that is independent of our perception of it, so that science is an attempt to explain in thought the things that act independently of thought. **Idealism,** on the other hand, is the view that the world exists only in so far as people think it exist. If our thoughts change, then so does the world. Kant (1724-1804) introduced this concept (Filmer *et al.*, 1998).

[2] Numerous terms have been used to describe the quantitative paradigm, such as, traditional, conventional, scientific, experimental, positivist, empirical and hypothetical deductive (Clarke *et al.*, 1999).

not there is a cause and effect relationship between variables. The data collection techniques associated with this approach are survey and experiment (Kumar, 1999; Clarke *et al.,* 1999; Peter *et al.,* 2002). Highly-structured questionnaires or interview schedules are the instruments used and include predetermined and standardised categories into which individuals' responses are fitted.

Features of the quantitative approach could be summarised as follows: firstly, it involves a scientific approach to the study of people, therefore the individuals' meanings and perceptions are not considered as an obstacle to the use of the scientific method. Secondly, only observable phenomena are viewed as pertinent. Unless individuals' feelings can be observed though deed or action, the quantitative approach does not consider them valid as data and relevant to the problem under examination. Finally, hypotheses are tested which are derived from theories before any data collection that accuse. Therefore, hypothesis formation and testing are separate phases in any research project. These can lead quantitative researchers to being pre-occupied with generalising their findings and making extrapolations beyond the sample group, and seeing the replicability of the findings in a variety of contexts.

4.3.2 The qualitative approach

Contrary to the previous approach, the qualitative method argues that people's feelings, perceptions and beliefs are essential to understand their social world. The qualitative researcher emphasises that the social world is a construct of these feelings, perceptions and beliefs (Berger *et al.*, 1971). Moreover, this social world cannot be understood by using the numerical approach of the quantitative researcher. People's own interpretations and motivations form the main route to understanding the social world (Kumar, 1999) and even to framing hypotheses, models and analytical techniques. It is an approach which entails seeing the world through the eyes of the people involved in the study.

The general characteristic of this approach could be summarised as follows: firstly, a description is given of the context in which the action or events occur as social knowledge is time and context-dependent; secondly, consideration is given to the social process as a series of integrated events; thirdly, the process of formulating and refining theory occurs as data is collected. Therefore, the phases of hypothesis formation and testing phases of the research are separate. Finally, researchers remain

wary of imposing inappropriate frames of reference on respondents which can result in inflexible, unstructured research designs (Golton, 1997). It can be seen then, that these characteristics contrast enormously with those of the quantitative approach.

4.4 Type of research

The phenomenon of alterations and modifications to Libyan public housing is still insufficiently well known and not studied. For the author, therefore, one of the aims of this study was to gain an understanding of the phenomenon and of the reasons for it. The lack of previous research means that the relevant variables or causes were not fully evident to the researcher prior to this research, hence there was a need for an exploratory study of the situation. As suggested by Kumar (1999: 9), an exploratory investigation is a study carried out to investigate the possibilities of undertaking a research study to explore a particular phenomenon, for example, of dwelling alteration in Libyan public houses. The main purpose is to gather information so that a description of what is going on can be made and the researcher can develop a 'feel' for the parameters of the subject matter. This means that the exploratory study takes a broader look at the phenomenon under study and no hypothesis is tested (Bouma, 1993: 89). The emphasis here is on the need to interpret what is going on, in terms of understanding the whole society and the meaning it has for would be participants. The events elicited in any further in-depth study are then better understood only when situated in their wider social and historical context (Bryman, 1988).

4.5 Definitional framework

4.5.1 Home owners

From the literature review which was discussed in Chapters One, Two and Three, it is clear that there is no fixed methodology for investigating either POE or dwelling transformations. This leads the researcher to concentrate on the common issues between theses two components and the terms used for both, for instance, ''user-initiated'', a term used by Wilkinson & Kardash (1991), in their study in Egypt and Dasgupta (1990) in India. Whereas Salim (1998), in her dissertation, uses "owner-occupier" instead of "user". Because of the similarities in the situations of the occupiers of public housing in Malaysia and Libya, from the point view of their owning and not renting their houses, the researcher will uses the term owners in this study. The term users is inappropriate in this study because it includes both renters as

well as owners, and Libyan law prohibits renters from extending houses that they do not own.

4.5.2 Alterations

From the literature review, it was possible to determine that there were no limitations to the number of changes or modifications which could be carried out by a house owner; from changing a door lock to adding a new space to an existing space, or removing and converting internal spaces. Therefore, in this research, focus is given to the way people interact with the domestic spaces in their houses by modifying, altering, changing and converting the spatial structure of its interior. If the original house has been completely demolished and a new house has been built, then it is not included in this investigation for many reasons. Firstly, this action would be greatly different from those of other respondents who would not have carried out similar actions, therefore, the comparison would not be valid. Secondly, the typology of any new house may differ significantly from the original dwelling, which has been chosen for the investigation. Lastly, the owner of the house may have taken the chance to build according to criteria which specifically suited him and his family, whereas this is not the case for the rest of the sample.

4.6 Conceptual models of place experience

Generally, a model is not an explanation, it is only a structure and/or a function of a way of organising data and events around a hypothetical explanation (Cooper & Schindler, 2003), or it is the sum of factors used to measure, explore and understand dwelling alteration.

In this section, the author discusses some models used to investigate subjects in architecture that have a close link with the concept of place experience. The following discussion raises the fact that the topic under investigation could be dealt with by using many types of models, some of which have already been used to investigate the phenomenon under study. This helps to construct a model which can be used in the current research.

4.6.1 Man-environment interaction model

Growing concern for alterations of the physical and social environments around the world has prompted researchers from various disciplines to concentrate their research efforts upon contemporary environmental problems, with the fundamental

assumption that an understanding of the relationship between man and the environment, as gained from scientific inquiry, could provide guidelines for urban planning and design. Among the phenomena that have been drawn attention to are those related to how building users imbue their housing environment with meaning, how they personalise it and, more recently, how they can contribute to shaping and improving the quality of their housing environment.

One of the models used to understand the man-environment interaction approach is given in Rapoport (1977). This model sees design as any man-made change to the physical environment and therefore all man-made environments are designed, in the sense that they embody human decision and choice (Rapoport, 1977). It is further argued that, if the chosen model of design is valid, then it becomes necessary to know how and for what reasons those choices were made and on what criteria they were based. The differences in the underlying chosen criteria are based on the choice process, which involves the elimination of alternatives that tend towards congruence to some ideal, so as to maximise a set of ranked values. According to Lansana (1992), the notion of a choice of a model of design is value-saturated and closely linked to the hierarchical notion of the concept of culture.

There are numerous and different views as to what culture means. Generally speaking, there is yet no clear way of viewing culture and its direct relationship with the built environment. From an anthropological view, culture is considered as important in defining humanity, and because of its importance, it is clear that it has many defintions, Rapoport (2000), for example, defines culture as a way of life, typical of a group. He considers it sometimes as a system of symbols, meaning and cognitive schemata, transmitted through symbolic codes and he views culture as a set of adaptive strategies for survival, which are related to ecology and resources. Altman (1975) argues that culture has several key components: first, it refers to beliefs and perceptions, values and norms, customs and behaviour of a group or society. Second, culture is used to indicate the cogntion, feeling and behaviours that are shared among a group of people in a consensual way. Third, it implies that these shared beliefs, values and the socialisation and education of new members of that culture, help to preserve consensus from one generation to the next. Fourth, society's values, beliefs, and practices involve more than mental behavioural processes.

Regarding culture, it can be seen as a concept that embraces all variables, as suggested by Rapoport and Altman, as the underlying motivating force that guides people in the way they make changes to their environment and provides a suitable place or set of places where social consensus can be accommodated and values transmitted to future generations.

4.6.2 Residential satisfaction

Many researches have been undertaken on various aspects of housing, but little information is available concerning housing modifications undertaken by owners and their levels of satisfaction with such changes, this is especially the case in Libya.

Ideas about the concept of residential satisfaction are so diverse that there is no commonly agreed definition of the term. Analysis of various writings on this concept do, however, reveal some common threads which makes it possible to deduce a definition that represents a synthesis of thinking on the concept. This is that satisfaction with residence is one indicator of the quality of living environment and assessing the level of housing satisfaction involves several complex social and organisational phenomena (Lansana, 1992).

Turner (1972), in referring to housing as a verb which describes the process or activity of housing as a product, notes that its vital aspects are not quantifiable at all. He identifies the most important of these aspects as the satisfaction or frustration of needs. He further points out that the margin of variation between housing and housing satisfaction is wide, and the analysis of the impact of housing on the lives of people is justified on the basis of activities which are relevant to their personal lives. Further, because he is advocating a spirit of self-build in housing, Turner sees a direct link between satisfaction in a house and the extensions to which the owner has created the house, almost irrespective of the actual outcome.

Research relating to residential satisfaction may be grouped into two different categories: firstly, studies of residential satisfaction as a criterion of evaluation of residential quality. Methodologically speaking, the studies which fall into this category are characterised by their treatment of satisfaction as a criterion, and therefore, as a dependent variable. The theoretical framework guiding this type of research is exemplified by the work of Marans and Rodges (1975), Cutter (1982) and Gifford (1987). The second category covers research into residential mobility. In this

case, residential satisfaction is considered as a predictor of behaviour and therefore, as an independent variable.

An integrated consideration of residential satisfaction would be determined by a series of theoretical frameworks which could be termed as a comprehensive model of residential satisfaction, in which this construct is considered as a criterion of residential quality and at the same time, as a variable predicting certain behaviours (Francescato *et al.*, 1989).

The use of satisfaction as a criterion measuring a person's attitude is not limited to housing, nor to the built environment. Satisfaction is a concept that has appeared in many fields; office evaluation by employee satisfaction, hospital evaluation by patient satisfaction, and site evaluation by visitor satisfaction. This broad use of satisfaction demonstrates the appealing validity of the concept and its utility in explaining the success of a range of phenomena (Sung-Ho, 1997).

One of the main studies related to satisfaction and alteration is that carried out by Morries and Winter (1987). They suggest a causal model of hypothesised influence on residential alteration as housing adjustment behaviour (Figure 4:3). Two key factors measured in this model are demographic and socioeconomic characteristics, and normative housing deficits. The former includes two sub-variables: family life cycle and socio-economic status, and the latter includes the space, and quality and expenditure.

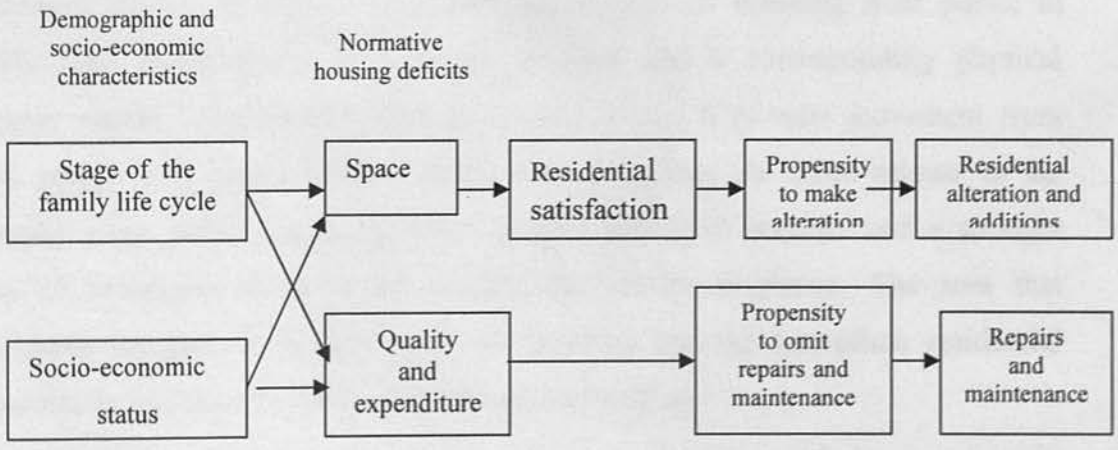

Figure 4:3 Casual model of hypothesised influence on residential alterations as a housing adjustment behaviour (Source: Morries et al., 1987: 196)

4.6.3 Defensible space

As many studies show, the physical framework of the built environment can influence residents' social activities. For example, Newman's work (1972) about defensible space, which became widely accepted in western architecture at the tail-end of modernism, illustrates how the physical framework affects human activities. He argues that:

> ''Defensible space is a surrogate term for the range of mechanisms- real and symbolic barriers, strongly defined areas of influence, and improved opportunities for surveillance – that combine to bring an environment under the control of residents. A defensible space is a living residential environment which can be employed by its inhabitants for the enhancement of their lives while providing security for their families, neighbours and friend'' (Newman, 1972: 76).

The assumption of defensible space is this; there is a predisposition, within the culture of the United States at least, for people to exert some level of visual control over the environment. The layout of the built environment does not cause such a predisposition to exist but it may arouse latent predispositions that will come into play once the opportunity exists. Newman provides considerable quantitative evidence to support the observation that some environmental structures express a social fabric better than others. From his study of the relationship between design characteristics and crime statistics, he concludes that some building patterns afford criminal activity more readily than others.

Communal spaces, he argues, have different degrees of meaning from public to private. The establishment of a social structure and a corresponding physical structure requires communal spaces at various levels. It permits movement from small groups and spaces towards large ones, and from the more private to the gradually more public spaces, giving a greater feeling of security and a stronger sense of belonging to the areas outside the private residence. The area that individuals perceive as belonging to the dwelling and the immediate residential environment, can extend well beyond the actual dwelling.

In spite of the contribution of Newman to the issue of space and crime, many other researchers provide evidence against Newman's position. Hillier (1988), as well as Simon & Chiih (2000), declare that the ideas of defensible space and territoriality as advocated by Newman should be regarded with more caution. Fewer line neighbours, segregation and cul-de-sac patterns are the qualities that Newman stresses in his

design theory for excluding the intrusion of strangers in the space, yet these qualities are the ones that make spaces quite susceptible.

4.6.4 Eco-analysis model:

Bearing in mind the model discussed in Chapter Three, as introduced by Lawrence (1991) which suggests taking an ecological approach to evaluate the built environment, Peled (1990; 1999) uses an eco-systemic approach to provide designers with relevant information for initial design decisions. The main concept behind this approach is place experience within eco-analysis which addresses itself to the individual unity of the ''I-world'' dialogue and attempts to bring about a change in its relation. The model is based on the hypothesis that the world makes itself present to the individual as a situation and a place. This I-world is experienced in its nearness as I-place Peled (1990, p. 233) provides the following definitions:

- ***The I-world***: Is an indivisible unity. The person and the world co-constitute one another. They give meaning one to the other. Being is actually "being–in-the-world'';
- ***The (I-world) relationship is a dialogue***: The person is always in dialogue with the world as a whole and the various manifestations of the ''other'' (people, things, spaces) he/she encounters in the world; and
- ***The meanings of the I-world relationship are grounded in naïve direct, immediate experience***: People experience the I-world in its materiality and through their embodied existence as beings that interact with the world through the sensory realms of the body. While involved in the goal-oriented activities of daily life, people tend to restrict themselves to the super-ordinate constructs of causal thinking, tending to take a natural attitude and assuming that the world exists independently and follows certain rules.

Following the thoughts of Peled (1990), Aspinall, (1992) suggests a model for eco-analysis with two parts. First, for each individual or group, the analysis begins with an exploration of the experience of a place as a whole. He uses a personal construct approach to do this (developed by Killy, 1963) in which the whole place is compared and contrasted with other similar and dissimilar places. From these comparisons, constructs are generated which represent the ways of seeing the places as a whole. In the second phase of eco-analysis, a location task is carried out in which the spatial organisation of design is explored. As individuals carry out this task, the meanings

and feelings that are invested in places are made much more explicit, giving insight and understanding to spatial layouts.

4.6.5 Human values model

Libya in general, and especially the Tripoli region, is undergoing a transformation in various aspects regarding individuals and their housing needs. This transformation requires many vital choices to be made and values to be upheld. Vital because the values people hold are important factors in determining their behaviour. Values in this context could be introduced as the root of human motivation or values can be seen as the conception, explicit or implicit, distinctive of an individual or a group characteristic, of something which is desirable and which influences the selection from available modes, means, and ends of action (Baier, 1971). Lansana (1992) summarises the concept of values as follows:

- Values act as standards to guide conduct. They are thus the central area of study of the comparison process.
- Values are attached to the object of any need; and
- Values generate normative standards by which human beings are influenced in their choices from the alternative courses of action which they perceive.

Generally, values as related to housing, would seem to be related to experience and behaviour in complicated variable, direct and indirect ways, and they are not made manifest straightforwardly. Individuals may also have higher or lower priorities, such that the choice of goals, in accordance with their value priorities, are objectively narrowed when opportunities in general are reduced by the structure of the society in which the individuals live (Lansana, 1992). Palmer (2003) states that, in spite of the importance of values as environmental regulators, they are not simply concepts to apply. The use of the values model to investigate transformations and changes in dwellings, and in particular of financial values, are complex.

4.7.0 Place-centred models

One model that combines many disciplines to evaluate the home environment and its dynamics, is introduced by Canter (1977; 1983), place experience, by considering place as a holistic transactional entity. In this view, the various elements are resolved to a dynamic process of evaluative experience, and it is this which represents the nature of place. Canter (1983) produces a model, which consists of three mutually

interrelated components. Place is the result of the relationship between ***actions***, ***conceptions*** and ***physical*** attributes. With the three-component model, it is possible to look for those aspects of physical attributes which have the greatest possibility of linking to the other components of the place in question (alteration). These constituents can best be visualised as three overlapping circles (Figure 4: 4)

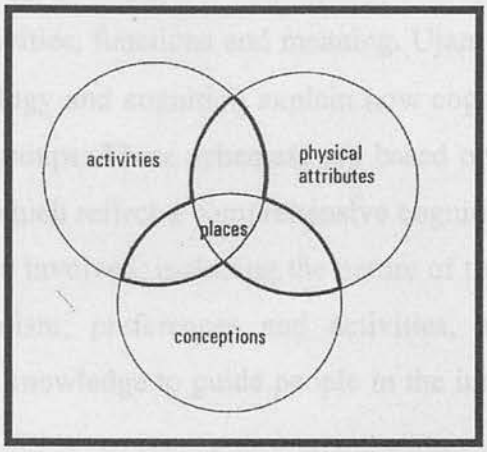

Figure 4: 4 Nature of place (Source: Canter 1983: 158)

Experiencing, means being in a situation, rather than experiencing spaces as a distinct entity. Thus, when people experience place, what they experience is the spatial givenness of the situation in which they find themselves. All entities in a place are presented to individuals in terms of their spatiality (Aspinall, 1992).

According to Amin (1994), unlike Norberg-Schulz, who uses the natural environment as the foundation of place, Relph begins with human experience defining places as significant centres of our world, arguing that places are the integration of human and natural order, expressions of people's immediate experiences of the world, therefore, places are defined by physical characteristics and more importantly, by the focusing of experience and intention onto a particular setting. In this respect, a place cannot be, and perhaps should not be, created in absolute terms on behalf of other people. It is often important for people to be involved in their environment, therefore, places have to be seen through their congruence with both the properties of the physical environment and the experience of people towards these places, due to their cognition about the desirable quality of living world spaces (Amin, 1994).

For most architects, an image of place seems to be its identity. An image has to be seen as a mental picture that is a product of experience, attitudes, memories and immediate sensation. The image of place consists of all elements associated with the

experiences of individuals or groups and their intention towards that place (Canter, 1988). Such images may be considered by others to be narrow and biased, but for those who hold them they are complete and constitute the reality of that place.

The place that is being experienced can range in scale from part of a room to an entire continent, but at all scales, places are whole entities, syntheses of natural and man-made objects, activities, functions and meaning. Ujam (1987) and Amin (1994) argue that culture, ecology and cognition explain how cognitive schemata exist and vary among different groups. These schemata are based on experience, knowledge, names and categories which reflect a comprehensive cognitive "style". Physical and non-physical factors are involved, including the nature of the environment, meaning, value, culture, symbolism, preferences and activities, and each culture has a distinctive structure of knowledge to guide people in the interpretation of their value and symbols.

In his article an aspects of spatial experience and structure Aspinall (1992) summarises two approaches, one based on spatial experience and the other on spatial structure. The first links our perception of space and architecture with the emerging awareness of the bodies we have as children, at an unconscious, feeling level wherein space is experienced. The second suggests that space itself has a social logic, one that is learned through an analysis of spatial structure and the way in which space has been organised for social purposes.

Canter (1983) argues that action and place are products of experience. He adds that the notion of action is distinct from that of behaviour in many ways, but one of the most important is that actions integrate conscious objectives. It is by acting on the surroundings that people make sense of it, in other words, and in the context of this research, it is by altering and changing dwellings that owners make sense of them. If the designer does not know anything about the owners' specific needs, the patterns of actions and objectives which are characteristic of existing transactions, then their design is most likely to be inappropriate.

4.8 Factors of the research model

In spite of there being many studies which deal with housing satisfaction in Libya, no study concerns itself with the phenomenon of alteration to dwellings. This means that no certain factors can be given priority in such an investigation and the researcher

needs to be receptive to all variables relevant to domestic space for many reasons. That said, and as a consequence of the definitions given in section 5.3 the author views the most important element in a dwelling, for any architect or house owner, as the space, the interaction of the family and activities carried out in the spaces which form the complete dwelling. This corresponds to one of the aims of this study to try to improve dwelling design and the appropriateness of dwelling spaces in Libyan public housing. The model suggested in the current research includes five main factors. These are: housing experience, housing satisfaction, the ideal home, alterations, and demographic characteristics of the residents. These factors include many other variables, as discussed in the following pages. Focus will be upon factors which can be shared in interpretation between the researcher and subjects (Figure 4: 5).

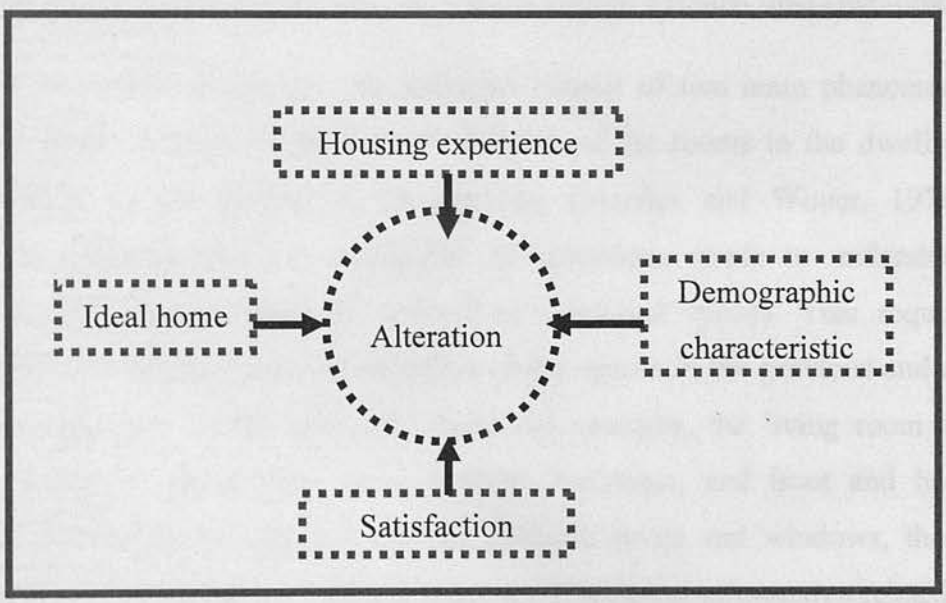

Figure 4: 5 Factors included in the research (source: the author)

4.8.1 Housing experience

Every experience as it is observed by the individual, is interpreted in the light of previous experience (Kelly, 1950). Clare Cooper (1974), who adopts Jung's notion of the house as a symbol of the self, finds a close correspondence between the ideal homes that architectural students create in sketches and their childhood homes. This shows that there are likely to be physical feature of settings which most people would feel are essential qualities of space and some which are idiosyncratic, being related to an individual's past experience. O'Neill (2001) argues that the concept of haptic and somatic space, which is defined as the way space impacts immediately on

the individual, in terms of their body and physiological awareness, has shaped the way in which environmental psychologists think about spatial knowledge.

The focus of spatial understanding has thus shifted to a tactile and positional awareness. People gain environmental understanding from tangible physical experience, from coming in contact with natural and built elements, and from moving through spaces, as well as from seeing objects in space. Therefore, the aim of the factor of housing experience is an investigation of the physical properties of the previous and current dwellings, and how owners have experienced the attributes of previous and current dwellings. This may include, for example, the previous and current dwelling type, the background of the owner of the dwelling, his or her way of arranging the dwelling, the number of the spaces in the dwelling, the type of material used for the roof and walls, the number of married people who live in the dwelling. All these factors can be understood to influence people's spatial understanding.

Because residential alterations and additions consist of two main phenomena: the increase in the amount of space or the number of the rooms in the dwelling and improvement to the quality of the dwelling (Morries and Winter, 1978), the researcher suggests that any evaluation of alteration, needs to understand the attributes and characteristics of a dwelling's internal spaces. This requires an awareness of how the owner has experienced the spaces in the previous and current dwellings and how he/she evaluated them, for example, the living room and its space, bedrooms, guestrooms, store, kitchen, bathroom, and front and backyard spaces. The factors include how owners evaluate doors and windows, then how comfortable the dwelling is during summer and winter, and information related to the internal space's suitability to accommodate the family's furniture. The aim is to obtain perceived residential environment quality indices through the evaluation of a set of attributes related to the housing experience of the residents.

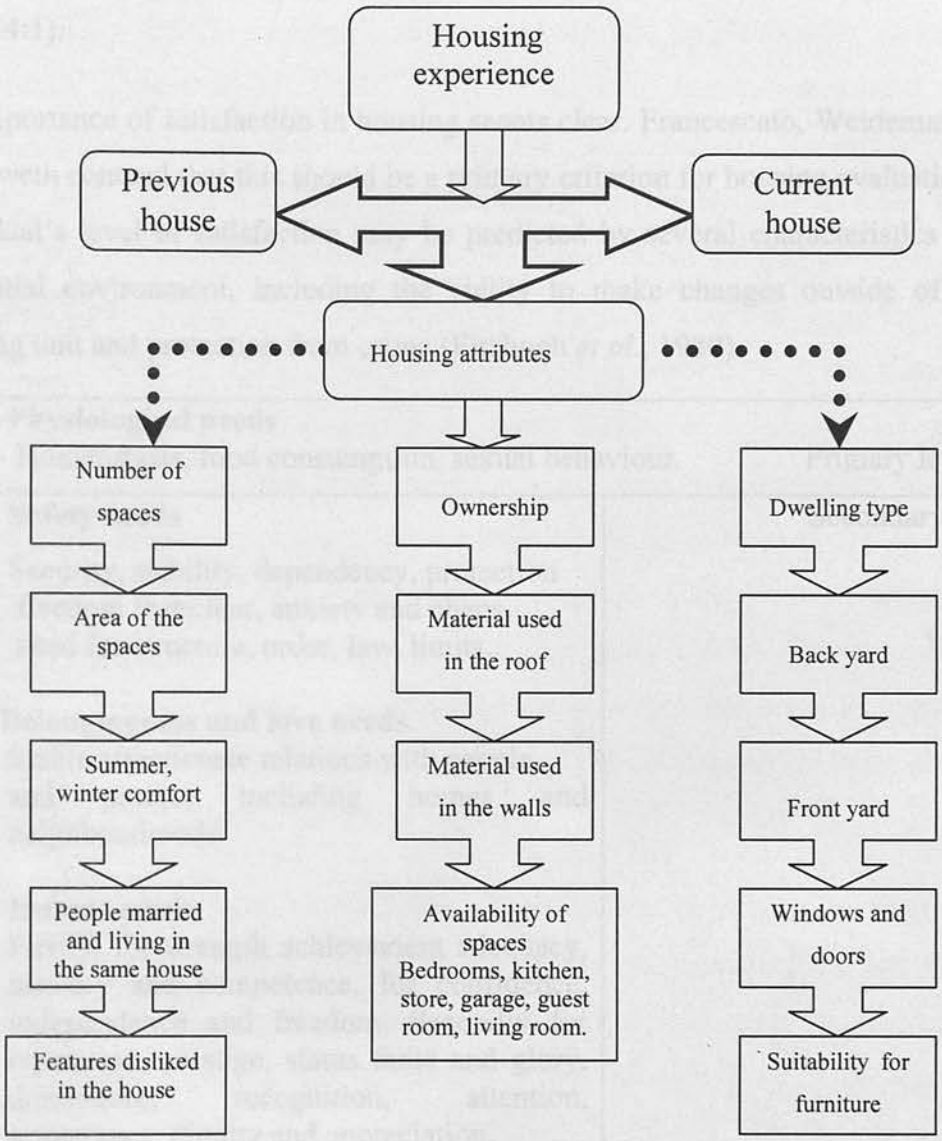

Figure 4:6 Sub-variables of housing experience

4.8.2 Satisfaction

The notion of human beings requiring to have their basic needs satisfied is established in psychology (Maslow, 1954). Hyde *et al* (2003) state that Maslow's theory is important for two reasons. Firstly, it locates the theory of need in explicit ontology. He argues that all human beings share a common set of needs. Not only does this mean that one can measure the extent to which an individual's needs are satisfied, but that these measures can be compared for different individuals. Secondly, Maslow is critical of the deficiency needs' approach to behaviour, which he argues is too narrowly focused on the basic requirements of human life, such as the need for shelter, food and clothing and to be free from harm. Cooper (1974), for

example, modifies the list of basic human needs which Maslow presents. He accounts for both conscious and unconscious human motivations, and personality (Table 4:1).

The importance of satisfaction in housing seems clear. Francescato, Weidemann and Chenoweth contend that this should be a primary criterion for housing evaluation. An individual's level of satisfaction may be predicted by several characteristics of the residential environment, including the ability to make changes outside of one's dwelling unit and protection from crime (Fitzhugh *et al.*, 1980).

1. **Physiological needs** Homeostasis, food consumption, sexual behaviour.	Primary level
2. **Safety needs** Security, stability, dependency, protection freedom from fear, anxiety and chaos, need for structure, order, law, limits. 3. **Belongingness and love needs** Stable affectionate relations with people and places, including homes and neighbourhoods. 4. **Esteem needs** Firstly, for strength achievement adequacy, mastery and competence, for confidence, independence and freedom. Secondly for reputation, prestige, status fame and glory, dominance, recognition, attention, importance, dignity and appreciation.	Secondary level
5. **Need for self-actualisation** Expressions of individual differences are significant at this level. 6. **Cognitive capacities** The desire to know and to understand are the preconditions for the basic need satisfactions. 7. **Aesthetic needs** The need for order, symmetry, closure, system and structure.	Tertiary level

Table 4: 1 Cooper's modifications of human needs (Source: Lawrence, 1987)

While some families make changes to their homes because they are dissatisfied with their dwelling and want to raise their level of satisfaction, others may do so because they are already satisfied, do not want to consider moving and want to continue to

make improvements (Morries & Winter, 1987). Many researchers consider satisfaction as an important variable for the evaluation of space in homes but this is unclear until the variables related to domestic space and satisfaction are understood. For instance, Osland *et al.,* (1993) suggest that four themes are related to this context: the link between space and privacy, the role of activity, the experience and use of different environments, and the presence of, and relationship to, other people. Donald (1990) states that the form, organisation, and use of domestic spaces are determined by more than occupants' behaviour. He adds a further seven factors that influence the shape of houses: their decoration, their placement in the community and their use by residents and visitors these factors are: climate, topography, available materials, and the level of technology, available economic resources, function and cultural conventions. These factors can be considered as domestic space determinants and at the same time, could be applied to the built environment in general. Canter (1983) takes a more general view and proposes that environmental experience, a ''sense of place'', is related to the activities that occur in a particular environment, the evaluative conceptualisation of the occurrence of those activities and the physical properties of that environment.

Architectural space is born of the relationship between objects or boundaries and from plans which do not themselves have the character of an object. To deal with the notion of domestic space is very complex; to simplify it into small measured entities may create many problems but conversely, it can provide a focus on significant issues.

In this research, focus is given to the link between privacy and space, the amount of space for activity and the position of space in relation to other spaces. (See Figure 4:8). Pennartz (1986) suggests that the atmosphere in a home is an inherent aspect of

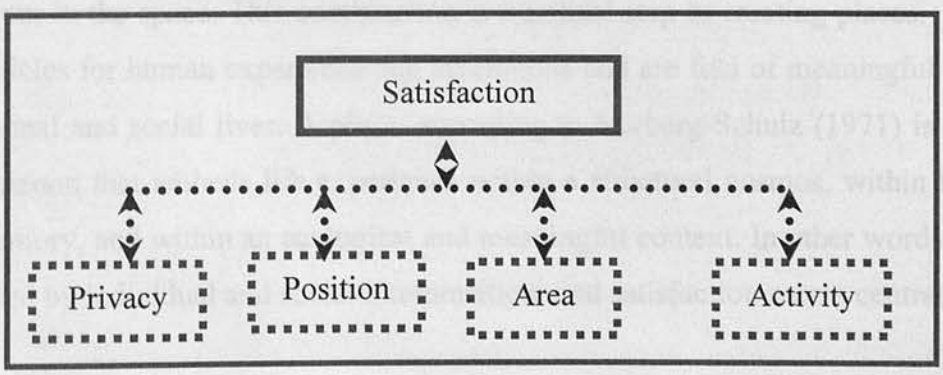

Figure 4: 8 Place satisfaction

living and it is the most comprehensive characteristic of place. He adds that the spatial characteristics of the dwelling affect the experience of its atmosphere and suggests three architectural themes that emerge in response to spatial characteristics:

- The arrangement of and connections between rooms;
- The size of the rooms; and
- The form and physical enclosure of rooms.

Satisfaction is viewed as an inappropriate measure by some designers and planners, practical users of the research and some social researchers. Francescato *et al.*, (1987) note five criticisms of satisfaction. These are:

- Reported satisfaction tends to be positive thus suggesting everything is all right.
- Subjective measures of satisfaction may not correlate with objective measure of context and behaviour.
- The level of satisfaction of individuals varies over time.
- Satisfaction tends to be higher when individuals lack an awareness of a better alternative.
- Fostering satisfaction, rather than attacking problems, may result in a sub-optimal housing environment.

They added that it is important to be aware of these limitations, however, and that these criticisms point out a need for research that addresses these concerns. It could then illustrate the impact of theoretical models, and might propose a research direction with clear theoretical foundation. This is a main aim of the current research.

It is not the space in itself that creates atmosphere, but space and the social actions that occur in the space. This combination is a critical step in creating places. Places are vehicles for human experience and aspirations and are foci of meaningful events in personal and social lives. A place, according to Norberg-Schulz (1971) is a total phenomenon that embeds life experience within a structural cosmos, within history and memory, and within an ecological and meaningful context. In other words, place is created by individual and social interpretation, and satisfaction seems central to it.

4.8.2.1 Activity

The experience encountered in different areas of the home also has relevance to an evaluation of space; the occupants' evaluation of space is also related to the activities they conduct in their homes. Tagg (1974), produced a list of the 30 most common activities conducted in the home. Later reduced to 15 by Oseland *et al.*, (1993) in their evaluation of space in homes. These are: sleeping, washing clothes, playing games, studying, watching TV, chatting/talking, cleaning, reading, relaxing, entertaining, listening to music, eating and cooking. Several authors propose that dwelling alterations occur to support the occupiers' lifestyles (Lawrence, 1978; Godchild, 1991), which therefore, incorporates the activities occupiers carry out. Overall, few home researchers mention any functional reasons for dwelling alteration (Golton, 1997). However, as Canter (1983) states, it is not easy to study each activity in detail because each one needs time to observe each activity and the person carrying out that specific activity. Therefore, in this research, the focus is on the amount of space available for activity in general within some spaces in the dwelling.

4.8.2.2 Privacy

Many disciplines are involved in the topic of privacy. Because of this, there has been a major problem in its definition and, therefore, there is much difficulty in relating one study to another (Newell, 1998). Newell (1995) reports that theorists could not agree on what exactly privacy is, whether it is a condition, a process or a goal.

Nevertheless, privacy is perhaps the most common element associated with home. Altman (1975:18) states that privacy is the ''selective control of access to the self or one's group'', meaning that privacy in the home is the ability of residents to prevent or support social and physical interaction as desired. Too much interaction may be experienced as an invasion of privacy and too little as loneliness. Therefore, privacy is a function of the regulation of both personal and situational factors. Personal factors include the individual's need for privacy, personal attractiveness, interpersonal skills, personality variables and the ability to utilise control mechanisms (Johnson, 1974 and Pedersen, 1999).

Privacy in western cultures is an increasing concern, as Pederesen (1999) and Golton (1997) observe, but it has always had a prominent role in Islamic culture. These societies are structured around principles from the Holy Quran and the Prophet Mohammed or Sunnah ''The *Sunnah''* of the prophet explains the Quran" and from

the scholarly interpretation of divine and prophetic texts. These three levels emphasise the protocol of regulating interactions between men and women. The basic principle is that women should not be visible to men who are not intimate relatives without a *Hijab*[1] (Shraim, 2000).

4.9 Neighbourhood satisfaction

Housing is more than the dwelling. It incorporates the neighbourhood and the quality of its environmental profile, and these become equally important factors in evaluating resident satisfaction (Rapoport, 2000). Neighbourhood satisfaction, in turn, serves as a motivating factor to residents in their decision to stay or to move. In this research, therefore, focus is given to the services at the level of the neighbourhood, for example, lighting and housing appearance as an indicator of housing quality, educational, health services, and accessibility of market (Reis, 2001).

Housing satisfaction and general appearance of the neighbourhood were closely associated with neighbourhood dissatisfaction, although perception of noise, friendless, community spirit, schools and crime were also important (Alison *et al*, 1993).

4.10 The ideal home

'Ideal' in the English language means "a conception of something as perfect, most suitable''. ''House'', ''home" and ''ideal home'' are the most common words used when referring to housing in the English language (Salamati, 2001). Salamati adds that the meaning of the words ''house'', ''home" and ''ideal home" vary in different societies, depending on cultural background. The influence of the spatial properties of the childhood home has been shown on people's notions of the ideal home. For example, Cooper (1974), found among students of architecture, that their designs for an ideal home resembled their drawings of their childhood homes. Later Cooper-Marcus (1992) found that the re-creation, in their present home, of entities from earlier homes was meaningful to her interviewees.

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[2]. In Arabic hijab means cover. It is a cloth that a woman wears to veil herself from strangers. This custom differ from one place to other. In some regions women cover all their bodies from head to toe. In other regions women leave their faces uncovered and only hide their hair.

The spatial configuration of one's ideal home may also reflect body image. Houses and homes as a metaphor of the body and the self have been discussed in many studies. In Libyan society, a society in transition, one can ask: to what extent do the housing design features meet the concept of the ideal home for Libyan public housing owners? What features do Libyan owners like to have in their dwellings? If these features take the form of a space that can be added to the dwelling or any other feature which might classify as an element in the overall structure of the dwelling, then investigating the changes that people voluntarily make to their dwellings is likely to bring to light their conception of the ideal home.

5.11 Demographic characteristics

One of the areas where quantitative and qualitative research is in agreement is where an ethnographer (or descriptive anthropologist) carries out a survey in order to fill some gaps in his or her knowledge of the community, group, or organisation. Lawrence (1987) points out that for each individual, the design, meaning and use of home interiors are intimately related to the arranging of cultural, socio-demographic and psychological dimensions.

Socio-demographic factors, such as age, gender, household structure and religious beliefs all relate to the design, meaning and use of home interiors. For example, older house dwellers do not generally use as much new technology as that found in younger people's homes. Furthermore, among older residents, traditional values may determine that the kitchen is viewed as the woman's space and design decisions here should reflect the priorities that relate to her values (Lawrence, 1987).

Research has shown that there are relationships between the physical features of the home and the demographic characteristics of the owners. For example, the social attributes of a person are related to the individual's choice of style in their living room (*Margaret et al.*, 2000). The meaning of home might also be different from person to person and from one age to another. In his research, Aspinall (1992) found that among older people, the most important factor is security.

4.12 Conclusion

This chapter explains the factors which are included in the model of house alteration and user for this research. This model is produced to suit the Libyan context, that of a country which is still developing, as was highlighted in Chapter One. Taking into consideration the dwelling alterations as described in Chapter Two, for example, most of the studies carried out neglect the situation of the country and will do not provide a full picture and understanding of the phenomenon.

This model has been constructed to understand the situations related to the alteration phenomenon in Libya. Both quantitative and qualitative were chosen to address the methodology approaches. The qualitative approach was chosen to give the respondents the opportunity to express themselves and explain their reasons for carrying out alterations.

In the next chapter, which will be focused on data collection techniques, the questionnaire structure and data analysis will be discussed.

Introduction to Part Two

In the previous phase, three themes were explored, they formulated the general understanding of the Libyan context, the phenomenon of dwelling alterations and the POE approach. They work as a preparation for the second phase of this thesis, the planning and conducting phase, which consist of three chapters. Chapter Four discusses the research design and methodology, the philosophical assumptions behind the two paradigms quantitative and qualitative approaches, followed by a review of the models used to study the built environment, then the factors which will be used in the current research are introduced.

In Chapter Five data collection techniques were established, followed by question types used and their scales as well as data analysis suggested such as SPAA and space syntax theory.

In Chapter Six, data collected in the survey was analysed and a comparison between the original plan and modified plan has been undertaken to formulate the finding of the research.

Chapter Five
Data Collection Techniques

5.0 Introduction

This chapter describes the second part of the methodology used in this research, in other words, the data collection techniques adopted. It explains the framework of the tools used in the data collection, the design process, how these techniques were applied and on what scales, as well as the data analysis methodology.

Many data collection techniques were available to the research. Considerations of time, resources and the circumstances of the subject under investigation played a role in selecting the nature of the techniques used in the research. For example, research experiment and observation (in which the author introduces change into houses and/or watches, over a period of time, how a family occupies the domestic spaces) are excluded. Any experiment in the homes, would have been intrusive and impractical. Observation on the other hand, would not have been accurate because most of the alterations had been made a long time ago. Also these methods are prone to generate findings corrupted by the presence of the researcher and the feeling, among subjects, that their lives are under constant watch.

The nature of the research called instead for a non-intrusive way to take a ''snapshot'' of public alterations and of users' attitudes towards their dwelling spaces. Therefore, questionnaires, checklists, photographs and physical measurements, as well as secondary data (original building plans, census) were used to accumulate information. Since the aim of the research was to investigate the living space in Libyan public housing, it required a tool that would help to understand these spaces. For this, the author employed space syntax theory. An overview of space syntax is introduced.

5.1 Topic sensitivity

The phenomenon of alteration in Libyan public housing is very sensitive. Oppenheim (2001) considers a topic sensitive if it embarrasses the respondent, whether it is asking for information about socially, legally disapproved or attitudes that might be seen to lead to incriminating answers. In this context, the phenomenon of modification and alteration in Libyan public housing is considered sensitive because the government considers any change or demolition as an illegal action. In the contract of public property ownership, Article (7) states that: "Before the settlement of the full payment, the second party (the occupant) is not entitled to make any alteration whatsoever that may undervalue the said property or to destroy or pull

down the building, wholly or partially without an intention of re-construction''. Furthermore, any house owner must have permission from the municipality before carrying out any changes, and it is difficult for any owner to obtain such a licence. The sensitivity of the topic is therefore considered in the questionnaire design and in the sequence of its sections.

5.2 The questionnaire

A questionnaire is simply a list of questions or statements (Babbie, 1991; Oppenheim, 2001) presented in the same order and with the same wording to all respondents. Questionnaires could be classified by methods of presentation to respondents, either by mail, telephone, face to face or internet (McNeill, 1990; Robson, 1993).

5.2.1 Advantages and disadvantages of questionnaires

Any data collection technique has advantages and disadvantages. In the case of questionnaires, Kumar (1996) and Bill (2000) summarise the advantages as: saving time and money, the straightforward analysis of closed questions, standardisation of questions and the ease of getting information from many people very quickly. On the other hand, the disadvantages of this tool are: a low response rate, self-selecting bias, and the possibility that respondents can consult others without the researcher's knowledge.

An extensive literature review was undertaken to design the questionnaire for this study, and it is presented in Appendix 1. The author decided that a face-to-face questionnaire was the best survey approach in the context of Libyan cultural, verbal and formal mores because mailing questionnaires does not work in Libya, and using the internet to email might not work since, demographically, only certain people in Libya have internet access, hence, a face-to-face questionnaire technique was deemed as most appropriate. The questionnaire then had to be simple and easy to understand and a maximum of twelve pages long. (Oppenheim, 2001).

5.2.2 Open and closed questions

Open and closed questions were used in the questionnaire. The main advantage of open questions is the greater validity and freedom available to the respondent. Any question discussing the reasons behind any action as taken by respondents is counted as an open question. Short, straightforward, closed questions were also used. As

Vaus, 1991, points out, these can give rise to false opinions, particularly as respondents cannot qualify an answer. False opinions can also occur because of the forced choice of one answer that may not be suitable for the subject. Therefore, as Weisberg and Bowen (1977) recommend, closed questions were used for asking about very specific aspects of a topic and measuring the strength of opinions.

5.3 Questionnaire structure

The questionnaire was divided into seven sections: previous and current housing experience; ideal home; satisfaction with the size of space, position, privacy and activity within the house; owners' evaluation of the services within the house; satisfaction with the neighbourhood; alterations carried out by the owners; and demographic information. The questionnaire was designed and written in Arabic and then translated into English for the purpose of this thesis.

5.3.1 Housing experience

The first section of the questionnaire includes 22 closed questions that investigate the attributes of the previous and current house in which the head of the family lived. This section is at the beginning of the questionnaire to elicit factual information and get judgments about subjects' previous and current housing environments. For factual questions, as Bill (2000) suggests, closed questions are more suitable.

The questionnaire begins with previous and current housing experiences for many reasons. Firstly, it gives the respondent the chance to understand the topic and activate his/her memory about the housing environment, with the intention of increasing the rate and quantity of the reaction of the subjects. Secondly, it helped build a trust between the subject and the research team. All questions in this section are straightforward and did not need too much concentrated effort.

Attributes investigated in this part of the questionnaire related to questions about the dwelling, the owner of the house, how many functional spaces there were in the previous and current houses, the type of construction material used in the walls and roof, the number of families living in the same dwelling, whether the house was comfortable during summer and winter and what features the respondent liked and disliked in previous and current houses.

The question about how many rooms and functional spaces in the previous and current houses occupied by the household, appeared quite straightforward (Salim, 1998).

5.3.2 Ideal home

The second section investigates the concept of the ideal home from the subjects' points of view. One question was introduced in this section. The question was open-ended, with the aim of firstly, discovering the features of the type of dwelling that seemed ideal to the subject and secondly, connecting these features to the modifications and alterations carried out by the house owners.

5.3.3 Residential satisfaction

This section is divided into three sub-sections. The first sub-section includes eleven questions investigating the respondents' satisfaction with the current house from the point of view of house size, internal height, and the area of the internal spaces within the house. The second part includes ten questions about satisfaction with privacy and the amount of space. Due to the shortage of time and in order to avoid an overlong questionnaire, the questions do not assess each activity separately in each space, but regard activity as an overall measurement variable, and the amount of space an attribute for activity. This approach can give almost the same indications (Canter, 1983). The third part includes nine questions, measuring satisfaction with the position of each space in relation to other spaces in the house.

5.3.4 Internal services' evaluation

This section of the questionnaire deals with the house owners' evaluation of the services within the house and includes twelve questions related to, for example, the electrical and water supply, electrical and sanitary fittings, and gaps between doors and walls, as well as gaps between windows and walls.

5.3.5 Neighbourhood evaluation

Thirteen questions are included in this section to measure subjects' satisfaction with the neighbourhood, from the point of view of privacy from neighbours, lighting levels, disturbances, transportation, proximity to public facilities, cleanliness and car parking. In addition to neighbourhood satisfaction issues, more questions were added in this section, such as, question nine, for example, which asked whether the head of

household would recommend this neighbourhood as a place to live. The aim here was to gauge respondents' satisfaction.

5.3.6 Alterations

This section of the questionnaire investigated alterations and modifications to the current house and the cost of each action, as well as its value to the family. Four questions are addressed in this section. The main question is an open-ended one, of three parts. The first part asks whether the respondent has carried out any alterations or modifications in his/her home. If the answer was yes, the respondent was then requested to describe the types of alteration and then determine whether this action was very expensive, expensive or inexpensive, as well as if the action was very important, important or unimportant. The last part of this question asks the respondents to give reasons why they carried out these actions. The same question was printed six times to give the respondents the chance to write down most of the activities related to modifications and changes in their dwellings. The question is structured as shown below.

Have you added to or modified your house? **Yes** □ **No** □

If yes, would you please name each intervention, change, alteration, modification you have made in your current home.

Intervention

.....
.....
.....

Very expensive □ **Expensive** □ **Inexpensive** □

Very important □ **Important** □ **Unimportant** □

Would you please give two reasons why you made this intervention.

1.....

2.....

5.3.7 Demographic information

This section includes ten questions covering issues of the respondent's sex, age, status, education, occupation, and personal and household income.

5.4 Variables and their measure

Every social phenomenon can be measured. While personal or household income can be measured precisely by numerical values, other constructs require the use of surrogates or proxies that indirectly measure a variable and may not be as precise. To elicit measurable information from respondents, the author presented scales with which the respondents could indicate the depth of their feeling for a particular variable on a numerical scale. The appropriate level of measurement for each variable depends on two things: firstly, how a construct is conceptualised and secondly, the type of indicator or measurement that a researcher uses (Neuman, 2003).

There are many advantages in the use of scales. For example, it can increase reliability and validity as well as aid in data reduction. In other words, it simplifies the information that is collected (Neuman, 2003). In the section on housing experience, for example, a scale was presented, to measure responses about the spatial area of the previous and current house, giving the three options of large, medium and small. To gauge respondents' evaluation of the services within their dwellings, they were invited to quantify this information in terms of good, fair and weak.

5.4.1 Quantifying satisfaction

Three types of scale are used to measure residential satisfaction: the Likert scale, facet theory technique and the household alteration scale. These three scales have been used in many previous studies.

5.4.1.1 Likert scale

To measure respondents' satisfaction with their house features, a rating scale was needed. Rating scales are a particular form of closed questions used whenever respondents are asked to make a judgement in terms of sets of order categories, such as 'strongly agree', 'favourable' or 'very often' (Neuman, 2003, p.190). There is a variety of rating scales, the most commonly used scale and the one most suitable for the questionnaire was the Likert[1] scale format. This uses five-point scales to measure

[1] The Likert scale was developed in the 1930s by Rensis Likert to provide an ordinal–level measure of a person's attitude.

respondents' satisfaction with their dwelling features, allowing them to represent their judgments along a scale ranging from 1 (very satisfied) to 5 (very dissatisfied). The most common number of answers or points on ranking scales are five, seven or nine. The use of a five-point scale has long been a favourite in social survey (Neuman, 2003). Previous research has made use of the four-point scale (Lansana, 1992), the five-point scale (Yockey, 1976) and the seven-point scale (Golton, 1996).

An example of a question using this format is:

To what extent are you satisfied with these features in your dwelling?

Very satisfied [1]	Satisfied [2]	Neither satisfied nor dissatisfied [3]	Dissatisfied [4]	Very dissatisfied [5]

This scale was applied to three sections in the questionnaire: residential satisfaction, internal services' evaluation, neighbourhood evaluation.

5.4.1.2 Facet theory and mapping sentences

Facet theory was introduced in 1950 by Guttman in the study of the structure of intelligence and applied for the first time in 1970 Dancer (1990, p. 367) defines facet theory as follows:

> ''Facet theory is structural theory; in essence, it provides an approach to defining behavioural constructs and to testing hypotheses concerning the correspondence between behavioural definitions and empirical observations on variables representative of a construct. A principal idea underlying facet theory is that, in virtually all empirical investigations in the social sciences, the particular collection of variables used for example, a set of questionnaire items forming a survey or a set of geometric objects used in an experiment involving visual perception are selected, not because of an interest the investigator holds in these specific variables, but more likely because they are thought to be representative of some larger behavioural universe.'' Defining this universe, in terms of sets that depict its various

fundamental conceptual (semantic) characteristics, is fundamental to facet theory'.

In other words, the author uses facet theory to construct questions that touch on a controlled number of issues such as (amount of space, privacy). Privacy and activity are related to the same aspects of the home which affect domestic space experience. Thus domestic space, privacy and activity were considered as three elements of the same facet, termed spatial experience (Canter, 1982; Osland & Donald, 1993).

In this research, map sentence was used in the questionnaire design before explaining the scale and the map sentence structure (Figure 5:1). Map sentence provides the basis for one part of the questionnaire design, where the elements of each facet constitute part of a question. In this research, a response scale of satisfaction similar to that recommended by Osland & Donald (1993) is used with some modifications such as reducing the facets to four: facet A includes privacy or the amount of space; facet B deals with the space of the bedroom, living room or guest room; facet C deals with relaxation or household activities; facet D deals with family members or visitors. Nine questions were used to elicit the satisfaction of privacy and activity within the house environment.

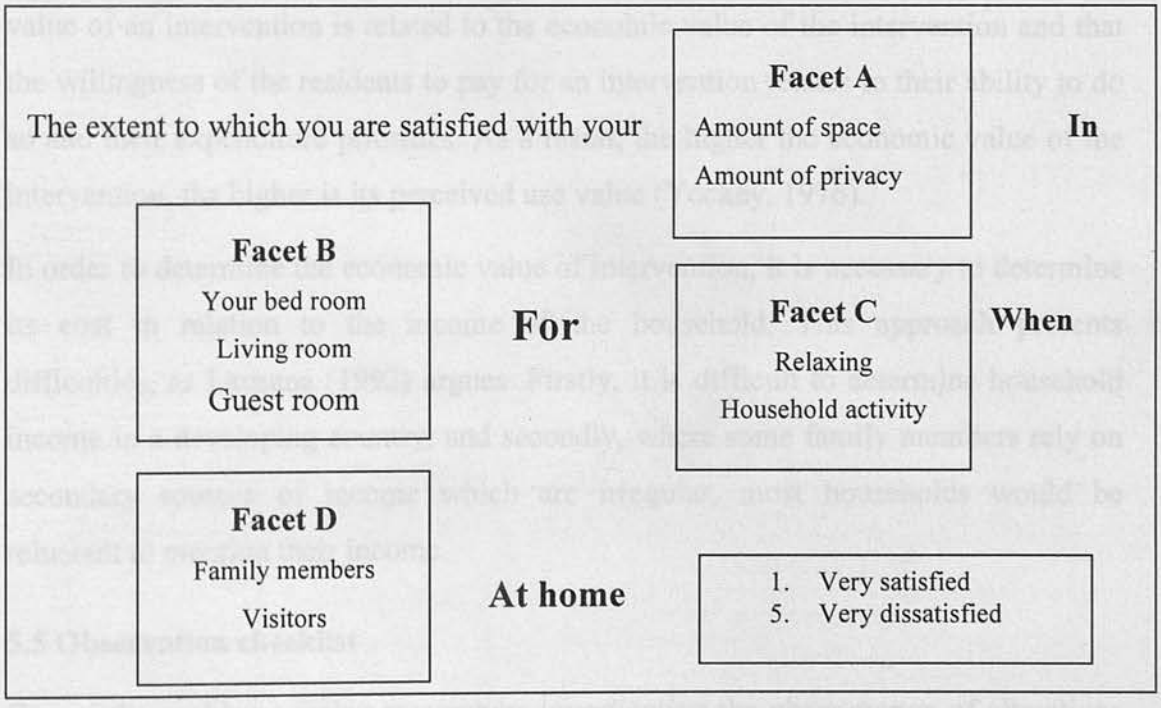

Figure 5: 1 Mapping Sentence structure

In previous investigations, for example, that of Osland & Donald (1993), twenty structures of mapping sentence were used in the questionnaire. The only limit to using facets depends on the time available and questionnaire design considerations.

5.4.1.3 Household alteration scale

Few studies have been devoted to the measurement of household alterations. Most of the studies have been carried out in the United States. The common practice of assessing intervention has been collecting information on the number and type of activities and the cost of the various activities. As mentioned previously, the last two parts of the question indicated the scale used in evaluating the importance of the modification to the respondents' alterations and the cost of these alterations. In each part, there were three indicators (very important, important, and unimportant) and very expensive, expensive, and inexpensive. These types of scale were used by Yockey (1976) and Lansana (1992).

Perceptions of the cost of alterations, however, are based on the willingness of the household to pay for their environment. For this to happen, their need for that particular intervention must be aroused to a level that justifies any economic undertaking, within their means. Therefore, it can be assumed that the perceived use value of an intervention is related to the economic value of the intervention and that the willingness of the residents to pay for an intervention relates to their ability to do so and their expenditure priorities. As a result, the higher the economic value of the intervention, the higher is its perceived use value (Yockey, 1976).

In order to determine the economic value of intervention, it is necessary to determine its cost in relation to the income of the household. This approach presents difficulties, as Lansana (1992) argues. Firstly, it is difficult to determine household income in a developing country, and secondly, where some family members rely on secondary sources of income which are irregular, most households would be reluctant to mention their income.

5.5 Observation checklist

One of the problems facing researchers investigating the phenomenon of alterations in housing is the difficulty in recording, classifying and analysing the changes in the field (Ulusoy, 1998; Etzion, 2001), therefore, an assessment tool was produced (see Appendix 2). This assessment primarily involved the completion of a checklist of the

characteristics of housing modifications carried out by the owners. Six cards were produced to be completed by the researcher, two for external alterations, two for internal alterations, one for neighbourhood observations and one for tracing physical measurements. These are as follows:

Card 1. The aim of this card was to record and code external alterations. This card is divided into three parts (Table 5:1). The first part includes information such as house number, neighbourhood, city and questionnaire number. Part two includes a table divided into three columns. The first column includes an alteration number, for example, ex1, ex2. In the second column, a description of the alteration, while the third assigns a number to each alteration type such as 01, 02. Part three of this card allowed for notes to be added. This card system gives flexibility to the researcher in allowing him to add any information about the alterations carried out and to add any activity during the field study.

Card	Purpose	Information	
Card 1	Record of external activity	P1	House number, neighbourhood, city, questionnaire number
		P2	Alteration number (Ex1, Ex2) Alteration description, Descriptive number(01, 02)
		P3	Notes

Table 5:1 Summary of Card 1

Card 2 is devised to gain more information describing external alterations. It is divided into three main parts (see Table 5:2). The first part is similar to Card 1 and includes information about the house number, neighbourhood, city and questionnaire number.

Card	Purpose	Information	
Card 2	Description of external activity	P1	Same as Card 1
		P2	Activity code
			Space
			Activity
			Size
			Material
		P3	Notes

Table 5:2 Summary of Card 2

The second part is designed as a table, divided into five columns, asking respectively for the alteration code, space, alteration, size and material. The column for alteration is divided into five sub-columns, that for size into three, with code S standing for small (any area less than 1.5m²), M for medium (1.5 to 4m²), and L for large (4m² and upwards). The third part of the card was similar to Card 1.

Card 3 is designed to record information about internal alterations. The design of this card is generally the same as Card 1 but focuses on internal, rather than external alterations (see Table 5. 3).

Card	Purpose	information	
Card 3	Record of internal activity	P1	As Card 1
		P2	Activity number (in1, in 2…)
			Activity description, Alteration description Number(001,002)
		P3	Notes

Table 5. 3 Summary of Card 3

Card 4 describes the internal alterations which had been recorded in Card 3, three parts. The first part is similar to the previous cards, the second is a table of six columns; activity number, space, activity, size, surface, material. As with Card 2, the activity column is divided into five sub columns, and the size, surface, material. columns are divided into three sub-columns. The third part is similar to the previous cards (Table 5:4).

Card	Purpose	information	
Card 4	Description of internal alterations	P1	Same as Card 1
		P2	Activity number (In 1,In 2)
			Space, Activity, Size, Surface, Material
		P3	Notes

Table 5:4 Summary of Card 4

Card 5 records any physical changes carried out by the house owner, recording them in three main parts. The first part consists of general information about the

questionnaire number, city, and neighbourhood, area of the house, front and back yards and the total area of the house. The second part includes the original plan of the dwelling before physical measurements. The third part traces any changes or modifications carried out in external or internal spaces (see Table 5:5).

Card	Purpose	Information	
Card 5	Physical measurements	P1	Same as Card 1
		P2	Original plan type A or Original plan type B
		P3	Notes

Table 5:5 Summary of Card 5

Card 6 is divided into two main parts. The first part is similar to that of previous cards. The second part includes eight statements describing the external spaces around the house under investigation (Table 5:6).

Card	Purpose	Information	
Card 6	Site observations	P1	Same as Card 1
		P2	Description of spaces around the dwelling

Table 5:6 Summary of Card 6

5.6 Access to research sites

The research, as stated before, is oriented towards evaluating the phenomenon of public housing transformation carried out by house owners. Such an investigation requires a sample from Libyan society, therefore, a site visit was undertaken in this research. Social survey emerged in the nineteenth century as an important new method for gathering information about the population (Tonkiss, 1998).

Due to the lack of information about the phenomenon of alteration to public housing in Libya and the characteristics of the house owners involved, and the size and type of these changes, the researcher undertook enquiries before proceeding with the actual site visit. These tasks included:

- Contacting the Estate Property Administration for information about the number of dwellings in certain areas and names of the occupiers of these dwellings, as well as the original plans of the houses constructed in that area;
- Contacting the Estate Registration Office to find property owners' registration certificates, which should be issued after all payments have been made; and
- Contacting local municipalities for construction licences for modifications or additions issued to any house owners in the neighbourhoods under investigation.

As a result, three aerial views of the neighbourhoods were collected from the Navigate Administration Bureau, as well as original ground-floor plans for two types of dwellings which had been constructed in the neighbourhoods. No complete ownership certificates were issued to most of the neighbourhoods' citizens, and no housing numbering system was found for these neighbourhoods.

Because the researcher was unknown in the survey areas, it was difficult for him to distribute the questionnaire or draw the changes. Therefore, three local people[2] helped him to organise the appointments with respondents as well as an architect to help make drawings during the visits.

5.6.1 The site

All three neighbourhoods chosen for the questionnaire survey were in Tripoli Metropolitan City (Figures 5:3, 5:4 and 5:5). These three neighbourhoods were built in the same year, 1972, and completed almost at the same time. They were constructed by a Moroccan construction company.

[2] The three local people were Walid Dofan for el-karama neighbourhood, Elsadek Abdulsalam for Gut el-shaal neighbourhood and Esaad Nakhsa for el-drabi site.

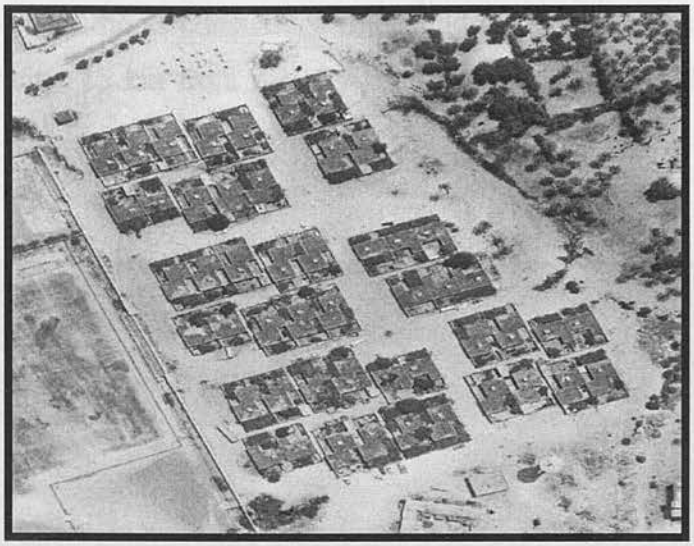

Figure 5: 2 El Karma neighbourhood

The dwellings on these sites were built back to back, in rows designed in collaboration between the Housing Secretary and the Moroccan company's architectural staff. Sixty-one storey housing units were supplied with water and electricity, 18 km from the city centre. Around 360 people live in this neighbourhood.

The general characteristics of these three sites at the time of the survey, however, varied; all of them have witnessed rapid transformations from their original design.

Figure 5: 3 Gut el-shaal neighbourhood.

Gut el-shaal neighbourhood consists of one hundred housing units supplied with water and electricity, 15 km from the city centre. Around 600 residents live in this neighbourhood.

Figure 5: 4 El-Drabi neighbourhood.

El-Drabi neighbourhood consists of 350 housing units supplied with water and sewerage systems, 12 km from the city centre. Approximately 2100 people live in this neighbourhood, which includes a mosque, a primary and an elementary school.

5.7 Dwelling types

Two dwelling types are included in this research. For the purposes of the study, they are referred to as Type A (Figure 5:4) and Type B (Figure 5:5). Both are single-storey houses, comprising of front and back yards, a guest room, three bedrooms, a living room, kitchen, bathroom and guest toilet. Type A is 125m² and occupies a plot of 234m²; type B is 125m² and occupies a plot of 321m².

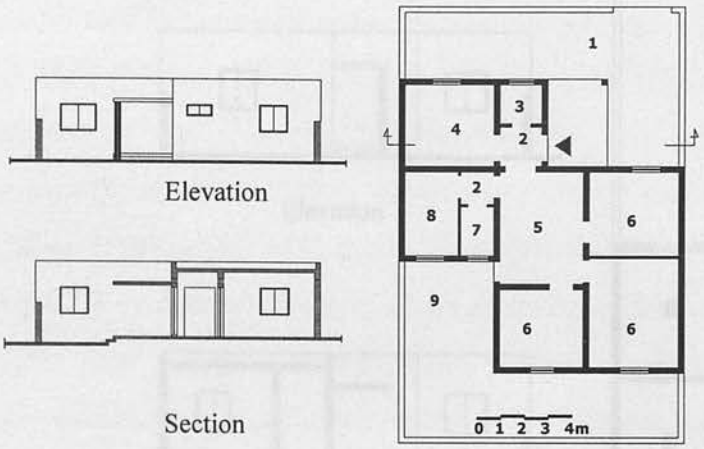

Figure 5: 5 Dwelling type A.

(Source: The author)

The construction system for both dwellings was column and beam. Walls were constructed from cement blocks with a thickness of 25cm for external walls and 15cm for internal partitions. The dwellings were divided into three zones. The first zone included the main dwelling entrance, the guest room, lobby and toilet. The second zone included the living room area. The third zone included the kitchen and bedrooms, with access to the backyard from the living room. All the spaces consist of windows which varied in their dimensions, approximately 1.2m by 1.1m, except the bathroom and the toilet. The internal height of the dwelling is 3.2m. No staircase was included in the original design.

The flat roofs were made up in three layers: concrete ceiling slabs, ptomaine isolation material, and paving material which is sand mortar and cement tile. The parapet height was 30cm. Reinforced concrete water tanks were constructed on the roofs.

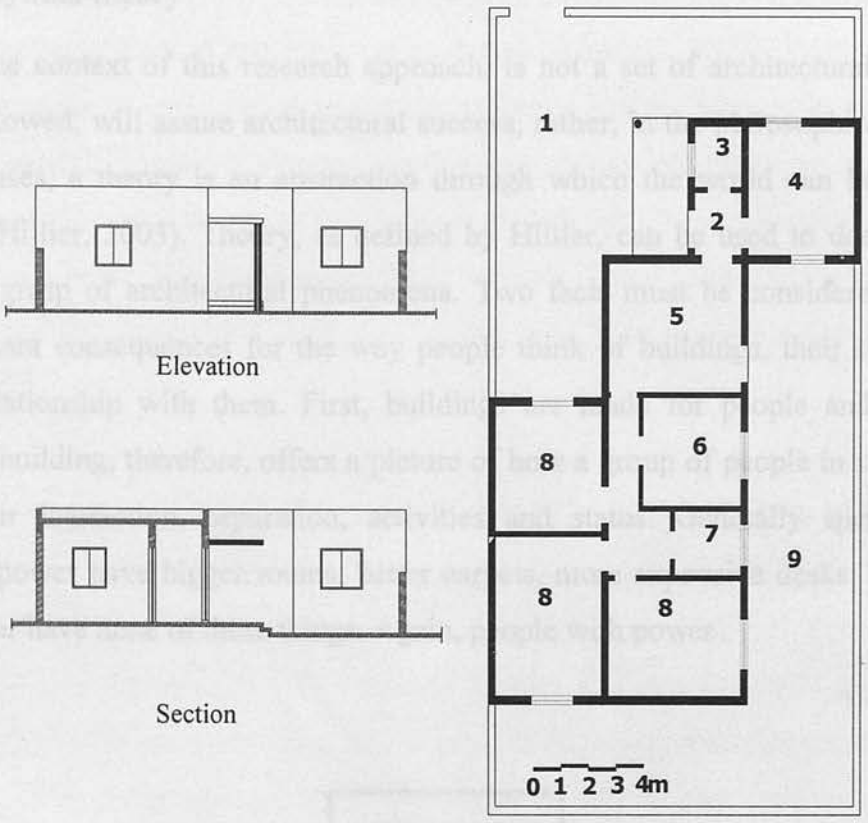

Figure 5: 6 Dwelling Type B (Source: The author)

The total number of units in each neighbourhood and type and number of units under study are indicated in Table 7.

Neighbourhood	Total housing units	Units under study		Location from centre
		Type A	Type B	
El-Drabi	360	24	4	12
Gut el-shaal	100	12	2	15 km
El Karma	60	6	2	18
TOTAL	520	42	8	-

Table 5: 7 Numbers of housing units in each neighbourhood

5.8. Data analysis techniques

A range of data collection and analysis techniques were used in the appraisal (Figure 5: 7). The three approaches used to analyse the data were: SPSS (Statistical Package for Social Science) for the closed questions; piling for the open-ended questions and space syntax for the physical measurements.

5.8.1 Space syntax theory

Theory, in the context of this research approach, is not a set of architectural rules which, if followed, will assure architectural success, rather, in the philosophical and scientific senses, a theory is an abstraction through which the world can become understood (Hillier, 2003). Theory, as defined by Hillier, can be used to deepen a researcher's grasp of architectural phenomena. Two facts must be considered and have significant consequences for the way people think of buildings, their spaces, and their relationship with them. First, buildings are made for people and their activities. A building, therefore, offers a picture of how a group of people in society organise their interaction, separation, activities and status. Generally speaking, people with power have bigger rooms, better carpets, more expensive desks. Those without power have none of these things. Again, people with power

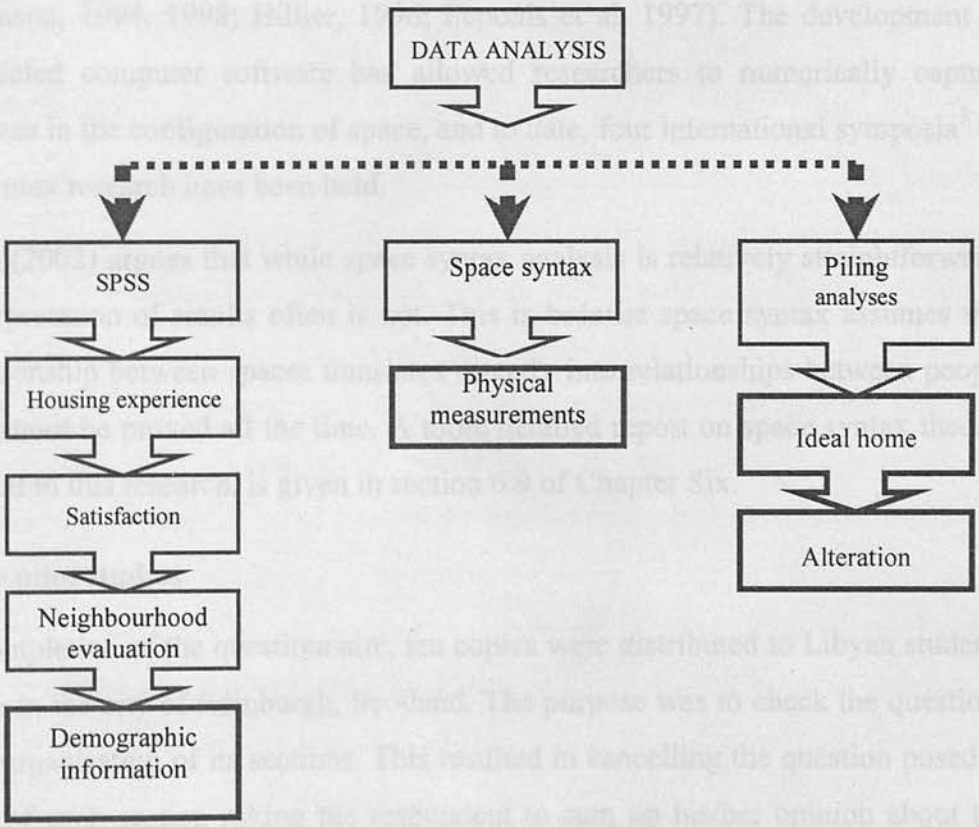

Figure 5: 7 Data analysis techniques used in this research

are often at the heart of a building, deep in the centre and not at its periphery. As a result, buildings are not neutral, physical objects but reflect the priorities of the society that has constructed them. Second, when seeking whether architecture affects behaviour or not, it is important to remember that people are not being related to as

neutral, physical subjects, but as already exemplifying human values; human behaviour is already part of the built environment (Aspinall, 2002). With this in mind, the advantage of space syntax to any researcher of housing alterations is that it shows how residents implant their own subconscious values into the house plan, by bringing the structuring of its spaces into a closer affinity with their culturally-shaped expectations of a home. The findings, arguably, indicate spatial plans that correspond to people's cultural values and then can be fed back into proposals for further development.

In 1984, a new way of describing and thinking about space in architecture was introduced. The main concept of this theory considers space as an active aspect of social life (Hillier et al, 1984). From this insight, Hillier developed space syntax theory into an extensive research programme looking into the spatial nature and functioning of building and cities. The reasons for that, as Dawson (2002) suggests, is the application of space syntax to a wider range of buildings and settlements, (see also Hanson, 1994, 1998; Hillier, 1996; Peponis et al, 1997). The development of sophisticated computer software has allowed researchers to numerically capture differences in the configuration of space, and to date, four international symposia[3] on space syntax research have been held.

Dawson (2002) argues that while space syntax analysis is relatively straightforward, the interpretation of results often is not. This is because space syntax assumes that the relationship between spaces translates directly into relationships between people which cannot be proved all the time. A more detailed report on space syntax theory, as applied to this research, is given in section 6.9 of Chapter Six.

5.9. The pilot studies

After completion of the questionnaire, ten copies were distributed to Libyan students studying in the city of Edinburgh, Scotland. The purpose was to check the questions and the organisation of its sections. This resulted in cancelling the question posed at the end of each section asking the respondent to sum up his/her opinion about the questions introduced in each section.

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[3] Four international symposia on space syntax have taken place. The first one was in April 1997, in London, UK, the second in Brasilia, Brazil, in March/April 1999, the third in Atlanta, USA, in May 2001, and the most recent in London, in June 2003.

The second part of the pilot study was carried out *in situ* by the researcher. This pilot study revealed the following:

- Because most of the residents came from many different places, where their original families still lived, most leave to visit their families on Thursday and Fridays, therefore, the researcher could not arrange any visits on these days.
- Due to the interruptions of family members, and occasionally visitors, the length of the visits varied from one subject to another. Generally, each visit took between 60 and 90 minutes.
- Subjects said that the questionnaire was too long and they preferred a short questionnaire with short questions. This led the researcher to sit with the subjects as much as possible to be sure that they completed the questions.
- The researcher found it was very hard to both complete the cards and take the physical measurement at the same time, therefore, an architect[4] was invited to do the physical measurements.

5.10. Conclusion

This thesis is an investigation into the phenomenon of alterations made to publicly provided housing in Tripoli Metropolitan City. Although this phenomenon is widespread, in the author's experience, and is particularly an indicator of highly significant lessons for social researchers and architectural developers, it has barely been studied, so this research project is a voyage into largely unexplored, unknown territory. It also seeks to investigate a social issue of great sensitivity, therefore, the author has been forced to create a methodological approach that both sheds light on an unexplored phenomenon and is sensitive to the concerns of the sample under analysis. With these limitations in mind, a simple model has been developed which includes studying the previous and current housing experiences, housing satisfaction and the ideal home, as well as personal information, all to understand and learn about the phenomenon of dwelling alterations in Libya.

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[4] The architect was a graduate of El-Fatah University Tripoli, from the Department of Architecture and Urban Planning Faculty of Engineering,.

Chapter Six: Data Analysis

6.0 Introduction

The data collected in the main study were coded, and built into computer files. Presentation and analysis of the data involved the following: firstly, one-way tabulation to study the frequencies and percentage distribution of the responses, as a descriptive statistic. This process was useful in the presentation of much data in a simplified way that could be understood by non-researchers. Secondly, factor analysis, as stated by Field (2000) through which the existence of clusters of large-correlation coefficients between subsets of variables could be viewed as measuring aspects of the same underlying dimension, known as factors. The purpose of factor analysis is to reduce a large data set of data into a smaller subset of measurement variables, in other words, this process also aims to simplify data and bring relevant findings to the forefront.

This chapter will be divided into three parts. The first part includes questionnaire analysis, the second part includes space syntax analysis and it ends with a discussion of the major dimensions which can be elicited from the survey that are related to alterations and the reasons for them.

6.1 General characteristics of the population

In this section, a descriptive analysis will be highlighted, for instance, household characteristics, neighbourhood characteristics, housing experience as well as the satisfaction with features of the current dwelling.

6.1.1 Household characteristics

Fifty households were included in the study survey, representing individuals with a mode (i.e. most frequently occurring) of 8 people per household. 98% of the subjects were male and only one was female and 80% of the sample were the first owners of the current house and just nine of the respondents were not. Generally this indicates that most of the respondents fall within the criteria of the research aims. Regarding the occupation of the subjects, 80% were government employees, and five people ran private businesses. The other five people were retired.

The age of the households can be distributed in three groups. 3 people were 35-44 years old, 13 people were 45-54 years old and the majority of the subjects 68% were

over 55 years old.

Monthly income (head of the family) can be distributed in four groups: seven of the respondents were in the first category, as indicated in the questionnaire ranging from 101-200 LD; 34% of the respondents in the second category ranged from 201 to 300 LD the third group, which represented 48% of the subjects earned income ranging from 301 to 400 LD and only two subjects recorded that their monthly income was more than 401 LD.

Family income had the same distribution categories with some differences in the range value of the categories. The analysis showed that 56% of respondents are in the fifth group, ranging between 700-900 LD, while 11 of the respondents were located in third group, ranging between 500-700 LD.

The level of educational qualification of the subjects under study was as follows: 14 indicated that they had up to a middle school certificate, ten of the respondents had up to a high institute certificate and eight had up to a secondary school certificate and six had a university degree. Just four of the sample were illiterate.

Regarding owning another house, 14 of the subjects currently owned another house, yet 72% of the sample did not. Eighty six per cent of the subjects were married, two of the subjects were divorced and four of the respondents did not answer the question.

Regarding families living together in the previous and current house: one subject said that he lived in the previous house with another two married males, 34% said that they lived in a house of two families. On the other hand in the current house, one subject reported that he lived with another two people from the same family, and ten subjects said they lived with another family. (see Appendix 4, Table 6.1, 6.2). It was observed that, in spite of Libyan society undergoing some transition, extended families still live together, perhaps for a combination of economic, religious and social reasons.

6.1.2 Neighbourhoods' characteristics

The three sites which have been visited, El-karama, Gut el-shaal and El-Drabi, as explained in the previous chapter, were all constructed at the same time. All were

designed by the same company based in Morocco and can be generally described as comprising single storey, flat-roofed housing units with a front and back yard, arranged in clusters. Questions about the neighbourhood were included in the survey questionnaire to elicit an objective assessment of actual environmental conditions of the respondents' housing environment. The technique adopted involved the use of an environmental assessment tool (Appendix 2, Card 6) presenting a checklist covering characteristics of the subjects' housing environment.

This card included the location of the house in relation to its surroundings, the level of house construction, external structural problems, spaces around the dwelling, the situation of the paths in the neighbourhood, and the evaluation of some other issues such as, noise, traffic, and street lighting. All observations could be summarised as follows:

From a structural point of view, all houses were in good condition, aside from three major problems visible from the outside. Firstly, six of the houses under investigation were experiencing external cracks, between the vertical and horizontal elements of the concrete frames and walls. Many researchers relate these cracks to the differences in temperature during the day and night and to different material used in the building. Secondly, five of the dwellings in the study were experiencing peeling of the external paintwork, indicating insufficient maintenance carried out over time. The third problem visible from the outside was plaster peeling on three of the houses, especially their front facades. From the survey, the researcher noticed a few of the families could not make any needed repairs to their homes for either lack of money or the ability to carry out and supervise such activity because of their age.

Regarding the spaces outside dwellings, ten home owners were interested in the spaces outside their dwellings, this can be observed through their planting of trees and clearing up litter. In general, most of these spaces were neglected.

Access to the housing under investigation was gained from the municipal streets and most of the paths were not well constructed, except in Gut El-shaal neighbourhood, where the paths were well constructed but badly maintained and in a poor state. In general, many dwellings in the three neighbourhoods had undergone visible change, especially to their height and external features.

New road works were observed surrounding the neighbourhood of El-

Drabi and El-Karama. However, there were no road works inside the El-Karama neighbourhood. Recently street lighting has appeared inside the neighbourhoods except on the main road leading to the area. Most of the residents were dissatisfied with the rubbish collection carried out once a week by private sector companies. Regarding the sewage system and drinking water, all the neighbourhoods were served, except in summer time, when most of Tripoli faces a drinking water shortage.

6.2 Previous and current housing experience

In this section, the housing attributes of the previous and current house are highlighted, it looks at general features, including the type of previous and current dwellings, and at internal spaces within these dwellings, and at climatic convenience.

6.2.1 General features of the house

Of all the households surveyed, 36% of the subjects had previously lived in a courtyard house, twelve subjects had lived in a single attached house, ten subjects in a detached house, and six respondents had lived in flats. Three subjects had lived in underground houses (see Chapter One). Of almost half of the households surveyed, 48% said that their previous house was owned by a private landlord, 28% said it was owned by the head of the family, four subjects reported it was rented from the government and seven respondents said it was owned by one of the family members. On the other hand, the current houses were all owned by the head of the family (see Appendix 4, Tables 6.3, 6.4). Furthermore, 13 of the subjects had built their previous houses and two had inherited their homes. On the other hand, 80% of the sample said that they had received their current home from the state (see Appendix 4, Table 6.5).

Regarding the number of spaces in the previous house (guest room, bedroom(s), living room(s), kitchen, and bathroom), 34% of the sample had five spaces, 34% of the subjects had six spaces and four subjects had seven rooms in their previous dwelling. The total number of spaces in the current house is eight, although nine of the respondents had sixteen spaces in the current home, which suggests that the subject had added a complete upper story on the roof. (see Appendix 4, Tables 6.6, 6.7).

In response to the question put to the respondents about the rooms used by the subject himself in the previous and current house, data analysis shows that

46% in the current house use 8 rooms and 32% in their previous house used four rooms (see Appendix 4, Tables 6.6, 6.7).

As concerns the roofing materials, 64% of the subjects indicated that in the previous house, concrete was the main material for the roof and 32% of the houses were roofed in hollow clay blocks. 100% of the current houses are roofed in reinforced concrete. The wall materials in previous houses were more diverse: 64% of the sample had limestone walls, 22% cement block walls, three earth and stone walls, and two subjects had walls of cement block and limestone. This indicates that people used local material in their previous house. All the current houses used a combination of cement block and limestone for the walls.

Fourteen of the sample had a front yard in their previous house, and all considered it as a small area. In the current dwellings (see Appendix 4, Table 6.8) 54% of the subjects described the front yard area as large, 32% considered it as a medium area and five subjects considered it as small. The answers could be distorted by the fact that some respondents have added areas to their front yards which were actually not originally in the main plot area.

Only seven subjects had a back yard in their previous homes, of which five described the back yard area as small and two as large. On the other hand, all current houses have a back yard. Sixty (60%) of respondents indicated the back yard area is a large area, 24% said it is a medium sized area, and 6% consider it is a small area (see Appendix 4, Table 6.9).

Regarding whether the subject had a garage in the previous house or not, 94% of respondents had none, although all current dwellings are supplied with one. Nine subjects had storage in their previous house, of whom six considered it was small.

6.2.2 Experience of internal space.

The minimum number of bedrooms in the previous house was one room and the maximum number was six. 30% considered them to be small, 38% considered them as medium and one subject considered it large. This compares with the current house where the minimum number of bedrooms was three in the original design though increased to six when the respondents added new spaces to their dwellings, particularly in those situations when a new floor was added to the dwelling.

Furthermore, eleven of the subjects considered the bedrooms in their current home small, 45% medium, and eleven subjects as large. It is clear from the data that the respondents' evaluation of the bedroom provision is more positive in the current house (see Appendix 4, Tables 6.10, 6.11, 6.12, and 6.13).

In the previous house 82% of subjects had one living room and one respondent reported that he had had two living rooms. 54% considered the area of their living room in the previous house as small, whereas fifteen subjects considered it medium in size. On the other hand in the current house, where 80% of respondents have one living room, and nine subjects have two, 38% considered it to be small area, 42% considered it medium and eight considered it large (see Appendix 4, Tables 6.14, 6.15, 6.16, 6.17). In addition, the data shows that 74% of respondents use this space for sleeping.

Regarding spaces nominated for the guest room, most of the respondents (86%) had one guest room in the previous house with only one subject having two guest rooms. On the other hand, in the current house, 80% of the sample have one guest room, and nine subjects have two guest rooms, indicating that in the social norms of Libyan society, privacy is required. 46% of the subjects considered the guest room area as a small area, 32% of them as medium and nine subjects as large. Further to this, 58% of respondents reported that they use the guest room for their family to sleep in, this finding may indicate a shortage of sleeping spaces (see Appendix 4, Tables 6.18, 6.19, 6.20, 6.21).

In the previous dwelling, 94% of respondents had one kitchen. 80% of these respondents considered it small, seven considered it medium. In the current house, 80% have one kitchen and nine have two kitchens, 58% respondents considered the current kitchen area as small, 36% considered it medium, and only three subjects considered it large.

When asked about having a store in the previous dwelling, only nine respondents had a store in their previous dwelling, while 82% had no such space in their homes, of those nine, only six subjects consider the store space as small. In contrast, in the current house, 36% of the subjects have a store, and 32% do not have this space. The researcher can state that all these current stores have been added by the owners. Only ten respondents considered their store as large.

In response to the question asked about whether the rooms in the previous and current house suited their furniture, 43% of respondents remarked that their previous house did not suit their furniture, and only six subjects recorded that their rooms did. On the other hand, in the current house, 90% of respondents considered their room as suitable for their furniture and only five did not (see Appendix 4, Tables 6.22, 6.23).

Overall, the data indicated that the respondents have moved into larger dwellings, on the surface at least; representing an upgrading in domestic space from the previous house. On balance, every category of interior space shows an increase in number and size, even though the new houses are not entirely sufficient for many respondents.

6.2.3 Doors and windows

Sixty per cent of the subjects considered their windows in the previous house small, ten subjects considered them suitable and five subjects considered them large. In the current house, 92% of respondents considered them suitable and only one subject considered them small.

Meanwhile 80% of the subjects considered the doors in their previous house suitable, three subjects considered them large and two subjects considered them small. On the other hand in the current house, doors were considered suitable by all people in the survey. Generally, one of the features in the traditional dwellings which has changed in the modern built environment is the size of the windows and doors due to the construction systems, this and especially the windows has had an effect on the climatic and social environment within the dwelling.

6.2.4 Climatic comfort

In this section, questions about the respondents responses: comfort during winter and summer, day and night showed:

6.2.4.1 *Summer*

In response to the question about the comfort of respondents in their previous homes during the day in summer, 60% felt comfortable, and 40% did not. In summer night-times, 56% of the subjects were comfortable, against 36% who were not (see Appendix 4, Tables 6.27, 6.28). In the current house, only 32% of respondents were comfortable in summer during the day in the current house and 68% were not,

while 46% were comfortable during the summer night 54% were not (see Appendix 4, Table 6.24, 6.25, 6.26 and 6.27). The answers show that, while neither situation coped perfectly with the stresses of summer heat, generally the new houses are performing more poorly.

6.2.4.2 *Winter*

The finding for winter was worse in terms of climatic comfort in the current house. Nearly all respondents (80%) had been comfortable during the winter day, and ten subjects were not. In winter nights, 64% felt comfortable and 36% did not.

In the current house, the number who felt comfortable during the winter day fell to 42%, those who experienced discomfort rose to 58%. In the winter nights, as few as 15 respondents experience comfort and 70% did not (see Appendix 4, Tables 6.28, 6.28, 6.30 6.31). As indicated in Chapter One, the winter in Tripoli is cold, these findings show that the current house loses heat far more rapidly than the previous houses. This failure in environmental performance can be attributed to inadequately insulated external walls and roofs, to the use of the concrete frame construction, and to the large windows that provide very little thermal resistance.

6.3 Disliked features in previous and current houses

This section of the questionnaire ended with a question about features that the home owners disliked in their previous and current house (see Table 6:1).

Feature description	Responses			
	Previous house		Current house	
	Freq.	Perc.	Freq.	Perc.
No enough rooms	46	92.0	33	66.0
Bad appearance	15	30.0	38	76.0
No play area for children	36	72.0	5	10.0
Other features				
Position of raised water tank	0	0	10	20.0
Parapet height	0	0	20	40.0
No garage	10	20.0	0	0
Identity as ''public housing''	0	0	13	26.0
Not my own house	9	18	0	0

Table 6:1 Features disliked by respondents in the current and previous house.

- In all significant points, the current house fared better. Better provision of functional spaces, such as play areas, and garage.
- Complaints were made about the parapet height and the

position of the raised water tank. As mentioned previously in (Chapter Five), the parapet height is not more than 40 cm which is not sufficient if the family wants to use the roof.

- Owning a house is important for nine respondents, on the other hand, thirteen respondents were not happy with the term ''public housing''.

6.4 Satisfaction with the current house

A five-point scale (with 1 indicating very satisfied and 5 indicating very dissatisfied) was used to measure respondents' satisfaction with specific internal features of their houses. Here, the term ''feature'' included area of the element, position of the element, activity and privacy associated with the element.

6.4.1 Spatial area

This section contained questions about satisfaction with the total space area within the current house (e.g. house size (**HSA4SIZE**), house height (**HSA5HEIG**), bedrooms (**HSA6SBED**), the area of the living room **(HSAS6LIV)** guest room (**HSA7SGUS**), kitchen (**HSA8SKIT**), the entrance (**HSA9SENT**) and the bath room (**HSA10BAT**).

Feature	Sum	Mean	Std. Deviation
HSA4SIZE	120	2.40	.97
HSA5HEIG	143	2.86	1.13
HSAS6LIV	145	2.90	1.13
HSA6SBED	129	2.63	.97
HSA7SGUS	177	3.54	.91
HSA8SKIT	186	3.72	.76
HSA9SENT	149	2.98	1.35
HSA10BAT	134	2.68	1.00

Table 6: 2 Mean and standard deviation of each feature n = 50

The analysis in this sub-section makes use of SPSS software. This allows the researcher to combine and distil the ratings measured on a five-point scale. Non parametric data (see Table 6:2) gives the total respondents' scores of the variables mentioned in this section. The figures reveal that the highest score was for the kitchen then the guest room space, followed by the entrance.

The answers show the level of satisfaction and dissatisfaction with these different spaces. It is clear that dissatisfaction is greatest with the space allocated to the

guest room followed by the space allocated to the kitchen, and respondents were satisfied with the area of the bedroom and the living room areas (see Appendix 4, Figures 1 to 9). This primary data analysis gives a foretaste of expected alterations in the current houses.

6.4.2 Satisfaction with the position of the rooms

Regarding satisfaction with the position of the rooms inside the house, the data reveals that 62% of respondents were dissatisfied with the position of the entrance to the guest room, 52% of the subjects were satisfied with the position of the kitchen to the guest room, 62% were satisfied with the position of the kitchen to the living room, 46% were satisfied with the position of the living room to the bed rooms, 38% were dissatisfied with the position of the living room to the guest room, and four were very dissatisfied with this. 48% of respondents were very satisfied with the position of the kitchen to the back yard. 80% were satisfied with the position of the kitchen to the bathroom, 50% of respondents were satisfied with the position of the bedrooms to the bathroom, and 74% of the subjects were satisfied with the position of the kitchen to the bedroom (see Appendix 4, Figures 9 to 17).

Regarding satisfaction with the position of the house features listed, primary indications are that the respondents are satisfied, except for the entrance to the guest room and the living room to the guest room.

6.4.3 Level of privacy

Regarding satisfaction with the level of privacy in the current dwelling, data analysis showed 56% of respondents were satisfied with the level of privacy in their bedrooms when a family member was at home and 26% of the subjects were dissatisfied. On the other hand, 50% of respondents were dissatisfied with the level of privacy in their living room for relaxing and only 36% of respondents were satisfied. In addition, 76% of respondents were dissatisfied with the level of privacy in their living room when there are visitors; only eight were satisfied with this variable. In general, 48% of respondents were satisfied with the level of privacy; only 40% were dissatisfied (see Appendix 4, Figures 18 to 21).

From this primary data analysis, two major points came up, firstly, that most residents are satisfied with the level of privacy in general. Secondly, it seems

that there is a lack of privacy in the living room, especially when there are visitors.

6.4.4 Amount of space (activity)

Regarding satisfaction with the amount of space, data analysis showed that 66% of householders were satisfied with the amount of space in the bedrooms; only thirteen respondents were dissatisfied. Regarding the amount of space in the living room, 44% of respondents were satisfied with the amount of space in the living room when there are family members at home, 46% of respondents were dissatisfied. 46% of respondents were dissatisfied with the amount of space in their guest rooms when family members were at home and the same percentage for dissatisfied owners. Regarding satisfaction with the amount of space in general, 54% of respondents were satisfied with the amount of space in their home and 38% were not. Regarding the amount of space in the garden, 68% of the subjects were satisfied, only 28% were not (see Appendix 4, Figures 29 to 31).

From the data analysis, it shows that the amount of space in the guestroom and in the living room, especially when there are visitors are the two variables most of respondents are dissatisfied with. It is observed also that all of the sample were dissatisfied with the kitchen area.

6.5 Evaluation of the services within the house

This section asked subjects about the materials and fittings in their homes, for example, the kitchen fittings and building finishes, as well as the natural lighting and ventilation within the dwelling. 56% of the subjects evaluated the sewage system within their dwelling as average, 80% considered the ventilation good and 80% considered the natural lighting as good. 70% considered their sanitary fittings average and 58% considered the electrical fittings average (see Appendix 4, Figures 27 to 32).

6.6 The neighbourhood

the respondents were asked Ten questions to elicit their evaluation of their neighbourhood. The sum of values, mean and standard deviation of the responses are given in Table 6:3. It indicates that the mean scores for **NQ10DISP, NQ3LIGHT, NQ1PRIVC,** and **NQ4APPER** are higher for than other variables.

Of all owners surveyed, 70% were dissatisfied with the general appearance of the neighbourhood, 56% were satisfied with the noise level, 84% dissatisfied with the

Variable	Code	Sum	Mean	Std. D.
Level of privacy from neighbours	NQ1PRIVC	199	2.54	1.00
The noise level in neighbourhood	NQ2NOISE	138	2.76	1.13
Lighting level of public area	NQ3LIGHT	199	3.98	1.00
General appearance of the neighbourhood	NQ4APPER	185	3.70	1.04
Proximity of transportation	NQ5TRANS	143	2.86	1.16
Proximity to store and market	NQ6STORE	151	3.02	1.12
External colour used for houses	NQ7COLUR	159	3.18	1.06
Nearness to health facilities	NQ8HEALT	143	2.86	1.25
Nearness to educational facilities	NQ9EDUC	105	2.10	.79
Adequacy of refuse disposal facilities	NQ10DISP	217	4.34	1.04

Table 6:3 Mean and standard deviation of neighbourhood satisfaction n=50

lighting level of public areas. 50% of the sample were dissatisfied with the proximity to stores and markets, 44% of the respondents were dissatisfied with external colours used for houses, 56% of respondents were satisfied with their nearness to health facilities; 86% were satisfied with their nearness to educational facilities; 86% were dissatisfied with the adequacy of refuse disposal facilities; 86% were dissatisfied with the parking areas, and only eight subjects reported that their dwellings had been broken into or burgled. This section included a question asking if they would recommend this neighbourhood to someone else as a place to live, to evaluate the general satisfaction of the subjects. Data showed that 50% of the subjects would recommend their neighbourhood as a place to live and 42% of them would not. (see Appendix 4, Figures 33 to 46)

6.7 Factor analysis

Subjects were asked to rate their satisfaction with the level of privacy, the amount of space and the position of the facilities within their homes on a five point scale (1 very satisfied, to 5 very dissatisfied). In total, there were 27 questions divided into 3 sections. Factor analysis operates on the matrix of intercorrelations between all the questions in the questionnaire. If the questions measured the same underlying dimension, then they would be expected to correlate highly with each other. On the other hand, if each question was unique, then there may be as many dimensions as questions emerging from the analysis (Field, 2000). Seven main principle

components had eigen values greater than 1 and accounted for 74% of total variance (see Table 6.4).

Considering these seven factors, it appears that three major dimensions can be recognised. Firstly, it is clear that four of the factors are related to concerns about guests - whether this be space, privacy, or room location. Furthermore, these 'guest' factors are independent of each other, reflecting different perceived aspects of the house layout. A further factor is devoted to family concerns, while the final two factors are linked to inside-outside relationships in the house. As a result, these seven factors could be indicators of three main dimensions. These are: interaction with guests, space for the family and inside-outside relationship.

6.7.1 Interaction with guests

The designers of the houses under investigation had overlooked the designation of any of the functional spaces for female visitors, resulting in most of the subjects using the living room area for such activities. As a consequence, any family member wanting to move within the house had to pass through the living room, which caused discomfort for both the female visitors and the male family members and infringes

Satisfaction	F1	F2	F3	F4	F5	F6	F7
Satisfaction with guest room area	.783						
Satisfaction with level of privacy in living room when there are visitors	.868						
Satisfaction with position of entrance to guest room		.838					
Satisfaction with position of kitchen to guest room		.836					
Satisfaction with position of living room to guest room			.870				
Satisfaction with position of guest room to bathroom				.890			
Satisfaction with amount of space in general when family members are at home					.796		
Satisfaction with amount of space in the garden						.759	
Satisfaction with position of kitchen to backyard							.771

Table 6:4 Factors related to satisfaction

Libyan social norms that require privacy is afforded to both sexes. Female guests, according to Libyan norms, should not be in direct visual contact with male members over 18 years of age if they have removed their *Hijab*.

Equally, for guests and visitors, the guest room entrance causes worry among the respondents. It is located in the main entrance lobby, a space through which every male guest must pass to enter the guest room. This causes a cross circulation between visitors and family members, it causes stress for the family members and embarrassment for the home owners and guests.

Movement between the guest room and main entrance and between the guest room and the toilet poses similar problems. Most of the social activity for male family members in Libyan families takes place in the guest room. Therefore, as in many other cultures (e.g. in the UK the space was the *parlour*) this space is mostly considered as an important social space which has a value for both the family and the visitor. It represents hospitality, the status of the family, and the degree of welcome shown to visitors by having an entire room set aside, filled with fine furniture and well looked after just for this purpose.

In addition, this space can be used by the family's neighbours if they have any (unforeseen) event and require additional space. It is interesting that some Libyan people consider the guest room space is not solely owned by them and available only for their immediate family's purposes, but is a space for all, for neighbours, other family members and visitors. This had an effect on the Libyan concept of space attachment which led Libyans to try to own, furnish, decorate, and organise well capacious space. In short, it puts the status and social responsibilities of the household on display and the home owner is naturally pleased to allow others to enjoy it. Most of the social activities for men happens after noon and can extend until late into the night. This means that the guest room space should be, somehow, isolated from the other spaces in the house to avoid disturbing the rest of the family.

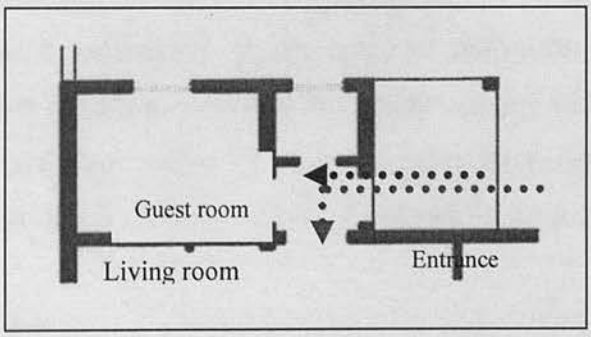


Figure 6: 1 Overlap of visitors and family private space

6.7.2 Space for the family

Generally, high density usually affects social interaction between individuals.

An increase in the number of people or decrease in the amount of available space (indicating social and spatial density), can lead to overcrowding in which individuals feel uncomfortable. In addition, the type of activity significantly affects the degree to which occupants perceive overcrowding.

With regard to the two types of dwellings (see Figures 5:5 and 5:6, previous chapter), they were designed to accommodate families with only five people but most of the families, if not all, have increased in size. This has caused crowding in some spaces, especially in the living room and bedrooms, to the extent that some families use the guest room for sleeping (see section 6.2.2). However, such situations can be addressed by many actions by the householder, for example, the family can change its family norms to adapt to the current housing conditions or it can alter the dwelling.

6.7.3 Inside-outside relationships

The respondents' evaluation of space is related to many parameters, one of which is the set of activities conducted in their homes. Certain activities are associated with particular rooms in the house, for instance, bathrooms, whereas other rooms, such as the living room, accommodate a number of functions which involve more social interaction. While bedrooms are considered individual areas, the living room was communal, in other words, it belonged to whole family, and kitchens were classed as belonging to the mother or females. In Libyan daily life, all female visitors are allowed to be in the kitchen, where their presence is much appreciated especially in helping the family in preparing food for social events. This activity immediately requires that the kitchen area is big enough to be used as a social space. To lessen the steam and high temperature caused by cooking inside a confined space, most householders transfer such activities to an external area and so they prefer dwellings with a back yard. This situation connects the inside spaces with the outside. In addition, many social activities within female and sometimes male groups shifted outside the dwelling into front and back yards, primarily because the rooms provide insufficient space.

The previous discussions and from predictors (factors), hypothetical alterations can be expected. Firstly, the lack of privacy in the living room and in the entrance lobby will motivate owners to carry out changes, Secondly, due to the

circulation overlap in the entrance lobby between visitors and family members, which raises problems for householders' norms and traditions, home owners can be expected to make some changes to this element. Thirdly, deficiency in some space in general can be considered as a push factor to carry out alterations and make additions of new interior space to the subject's houses. The following discussion on the ideal home is expected to support these notions, therefore, the research concentrates on the actual alterations, to see how the facts on the ground correlate with the residents' expectations, as derived from the questionnaire.

6.8. The ideal home

The questionnaire includes one open-ended question related to features respondents would like to have in their ideal home. In order to sum up the information provided, tables are used to show the number of times responses are repeated throughout all 50 questionnaires. Thirteen features were mentioned by subjects; these features could be categorised into three categories: functional features, form features and life-style features.

6.8.1 Functional features

Six features were related to function, as shown in Table 6:5. Sixty per cent of the subjects wished to have a store in their dwelling, the reasons for that, as stated, were mainly for food protection. Fifty per cent of the subjects wish to have a separate women's guest room, the main reason for that is women's privacy.

It is significant that the large kitchen is the most frequently mentioned, which indicates the necessity of such a space to the family, perhaps this shows that the home owner is highly motivated to provide a good kitchen space for the women where they can work and meet with other female guests. This feature is linked closely to the wish for a store room, which would release space in the kitchen, it is almost certain that the store enables the household to maintain a wider range of food stuffs.

No.	Feature	Freq.	Reasons	Freq.
1	Large kitchen	40	Easy for activity Family comfort	30 20
2	Store	36	Food protection Functional requirement	30 18
3	Large guest room for men	30	Family comfort Social activity	18 12
4	Women's guest room	25	Family comfort Social requirement	25 20
5	Two entrances for the dwelling	28	Family and guest comfort Service	23 14
6	Guest room separated from the dwelling	20	Privacy Social activity	16 10

Table 6:5 Functional features

The wish for two entrances, raised by more than half of the respondents, also encapsulates the desire for privacy and visible generosity. In traditional homes, an entrance for guests was common and separated to offer more freedom for family activities (see Figure 1:12, Chapter One).

Also of interest is the separation of the guest room, into a self-contained space, this wish not only shows a desire of the home owner to achieve privacy for his own family but to treat guests with courtesy as well as to allow them privacy.

6.8.2 Formal features

To any researcher into human needs and architecture, the formal features of the home are the most information-rich, in that they encapsulate the housing wishes as a totality in an image that is independent of small-scale practical issues.

No.	Feature	Freq.	Reasons	Freq.
1	Two-storey building	40	Separation between sleep area and living area More facilities	39 35
2	Arcaded front façade	35	Islamic style More beauty	25 19
3	Villa surrounded by yards	25	Future extension Social family activity	20 18

Table 6:6 Formal features

The first finding indicated in Table 6.6 above is that these features contradict the hypothesis put forward by Cooper (see Chapter Four, 5.9) that the ideal home is shaped by memories of the childhood home. The author can state with some confidence, that it is highly unlikely that some, if any, of the respondents grew up

in two-storey, arcaded villas. The typical house has not one of these characteristics. The features show a forward-looking aspiration to a new house typology, an aspiration most likely triggered by massive social change since the oil boom.

The desire for an arcaded front façade is very intriguing, particularly in its association with "Islamic style", as given in the reasons. Ujam (1987) suggests that the Islamic arch, in which the upper part, or head, is wider than the lower, rectangular, part of the opening, is an abstraction into geometric form of a wide range of meaning; it can be linked to the human body, with the head, where the imagination resides, therefore, the arch is more than an optional employment of material's natural properties in a building, but an element which motivates the deepest cognitive memory of mankind.

In the context of a hot country, the arcade also offers spaces that are shaded. Indeed, many internal courtyards of traditional homes have an arcade to one side, allowing the family to enjoy the outside space untroubled by the sharp sunlight, and in many Muslim towns (such as Asfahan, Cairo, and old Tripoli city) the main square is surrounded by arcades where people set up market stalls or small cafés. As suggested by many architectural writers (e.g. Venturi, 1961), the arcade allows a house to present windowless walls to the outside, while at the same time breaking down the surface appearance that does not appear featureless or blind.

6.8.3 Life-style features

If the structural design of the building is determined by climate, type of building materials and the way of construction, then the internal spatial organisation

No.	Feature	Freq.	Reasons	Freq.
1	Dining room	12	Modern life requirement Other uses	5 7
2	Study area	9	Study activities Keeping books	8 7
3	Main gate far from house entrance	9	More privacy for family Social activity	6 5
4	Office	8	Working home Reading activity	6 5

Table 6: 7 Life-style features

of the house is the result of the social and cultural or life-style conditions. These factors are also very important in shaping the built environment at the

neighbourhood level. In the above table, four features are categorised as life-style features. All the features mentioned reflect a new life-style in Libyan society, especially since the oil boom of the 1970s. In spite of that, traditions which connect Libyan society to their culture still exist. For example, food is placed in the middle while people gather in a circle around it. If the gathering for food is very large, more than one circle is formed. This tradition is noticeably disappearing, to be replaced by dining.

A study area and office are new features mentioned by subjects. These two features reflect the dynamic of Libyan social life which is starting to attain a modern life-style, very few Libyan people used to use their homes for work. The home as a workplace was confined to small-scale handicraft and these activities were normally carried out by women. The desire for a study area brings to light the fact that most Libyan children study in schools and universities and this has led people to need some private space for studying and shelves for books.

6.9 Household alterations

The pilot study carried out prior to the main survey showed the researcher that it is difficult to draw a clear and distinct line between what constitutes improvement or changes for some interventions, therefore, for the purpose of clarity, this study concentrates on the type of interventions connected with construction activities that change the physical attributes of the original dwelling design, for instance, adding a new space, converting space to a new function, or changing the original circulation pattern. This then limits the range of features investigated to those that can be materially compared to the original plans of the houses under study.

Maintenance and repairs are not included or any activities carried out with the purpose of restoring the dwelling to its original condition in order to prevent deterioration. However, the researcher found some other changes needed to be considered, for example, changing the lie of water pipes in the kitchen or bathroom because such changes involve many other changes, such as adding ceramic tiles to the kitchen walls. Soft landscaping in the front and back yard was also included, in spite of this making no addition to the area of the original plan, but the research noticed that most of the subjects carried out such activity which indicates the importance of these activities. Thirty- five types of interventions were

identified in the investigation. Table 6:8 indicates these interventions. These activities are categorised in three groups as indicated in Figure 6.2.

Type of alterations
Adding a new floor
Adding rooms on the roof
Adding a staircase
Adding a store
Adding a garage
Adding a room in the front yard
Adding a room in the back yard
Adding a shop
Adding a new entrance
Converting a kitchen to a bedroom
Converting a bathroom to a lobby
Converting a bedroom to a living room
Converting a guest room to a bedroom
Adding a space to the living room
Adding a space to the guest room
Adding a space to the kitchen
Removing upper water tank
Decoration in guest room wall
Decoration in guest room ceiling
Decoration in living room wall
Decoration in living room ceiling
Modifying the parapet
Modifying the main entrance
Fitting electrical fan
Fitting air conditioning
Fitting kitchen cabinet
Fixing steel bar for windows
Changing the water supply pipes in the kitchen
Changing the water supply pipes in the bathroom
Changing ceramic tiles in the kitchen
Changing ceramic tiles in the bathroom
Adding ceramic tiles in the kitchen
Adding ceramic tiles in the bathroom
Adding ceramic tiles to the front facade
Adding steps

Table 6. 8 Owners' alterations

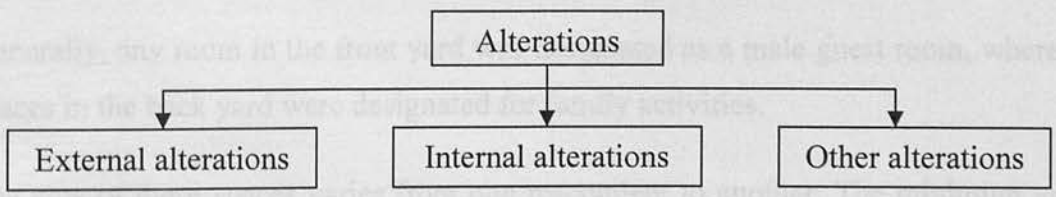


Figure 6. 2 Alterations' categories

This category of dwelling alteration covers all those that alter the appearance of the outside of the house. This does not mean that they do not also affect the interior, in many cases, as in the addition of rooms. The author distinguishes three main types of external alterations and additions, in which new spaces are added, either in the front and back yard or on the roof, external enhancements, which involves works done to the physical envelop of the plot or the dwelling, and landscaping, which involves surface treatment of the front and back yard.

6.9.1 External additional

Table 6.9 indicates the nine external actions that emerged from the survey. Most can be determined as large-scale however, alterations less than 20m² can be found in the front or back yards, up to alterations that cover the entire roof.

Alterations	Freq	Reasons	Freq.
Adding store	26	Keep staff protected and clean No space for storage	24 26
Adding staircase	24	Need to use roof Built new rooms	24 18
Adding new room in front yard	23	Comfortable for family and guests Social considerations	18 10
Adding rooms on the roof	20	More space As a store For washing Can be used in future	13 5 3 6
Adding room in backyard	22	More space Converting room inside dwelling	20 15
Adding roof for garage	10	More space can be used Car safety	7 5
Adding new floor	9	Not enough space Investment Family Comfort More privacy	8 6 6 5
Adding shop	6	Improving family income More space	4 5
Adding new entrance	3	Family comfort	3

Table 6: 9 External alterations and the reasons for them.

Generally, any room in the front yard was designated as a male guest room, whereas spaces in the back yard were designated for family activities.

The area of these spaces varies from one respondent to another. The minimum area was between 2 and 4m² which could be found as a store or a toilet, whereas, the

largest addition can be found as a complete new flat with 130 m² for dwelling type A and 150 m² for type B.

Three of the respondents added a new entrance to their homes, the aim being to avoid cross circulation between guests and family members or female guests. The researcher here wants to point out that such actions are found in these homes where the respondents had two main facades, both of them with direct contact with the street.

Two types of staircase were found: an enclosed staircase with a roof or an open staircase. In other words, every enclosed staircase was added in the front yard while an open staircase was constructed in the back yard. The main function of the latter is for use by female family members, to connect the back part of the house to the roof that functions as a washing area, offering a private zone as can be found in many traditional houses.

These first results already indicate that many alterations are carried out to secure boundaries between guests and the family. This is borne out by the reasons given for front yard alterations: ''comfortable for family and guests'', and ''social considerations''. Even large-scale alterations, such as adding a new floor to the roof cannot be separated from matters of privacy; rather than seeking to reinforce a hierarchy of spatial use within a compact dwelling.

The most frequent addition, however, was a store room. This was always built in the back yard, accessed through the living room. In nearly all the cases where a staircase was added to a roof, this took place at the front entrance (see plan in Section 6.5, 6.6.). This gives immediate advantages in providing family privacy, in that access to existing and new roof space does not require a visitor to enter or pass through the house.

Materials used to construct the external transformations were reinforced concrete for the structure and limestone or hollow cement blocks for the walls, with internal plastering and external plastering and rendering (Taratsha) for external walls.

6.9.2 External enhancements

The second category for external actions includes any enhancement to the plan or

building envelope. These changes fall into three actions: modifying the parapet, modifying the boundary wall, adding ceramic tiles to the front façade (table 6:10). These enhancements are a combination of practical and decorative alterations. In both instances, therefore, they indicate how the house, as originally built, does not fully address the daily, objective needs of the dweller and, at the same time, does not include elements that add meaning and expression to the built, lived-in environment.

Alteration	Freq.	Reasons	Freq.
Modifying the boundary wall	29	Protection Personal need Decoration	27 10 2
Modifying the parapet	27	Family protection Aesthetic feature	27 10
Adding ceramic tiles to the front façade	5	Easy to maintain Beautiful façade	6 2

Table 6. 10 External decorative actions

In the original plan, the plot was demarcated with a boundary which was disliked by residents as a form or because of its height, given that large windows are used, this will expose the private space of the house to public view. As a consequence, over half of the households, have extended their boundary walls and in almost all cases the reason cited is protection. The author wishes to point out that such changes have a knock-on effect. Thus, when one household is surrounded by neighbours who have built high boundary walls, they will feel exposed and vulnerable to an even greater degree. The normal outcome is that this alteration will become universal to each neighbourhood.

Extending the parapet fulfils a similar need for privacy, in that it allows the family to occupy the roof space as a usable domestic area, without feeling that strangers can observe them. It is interesting that ten respondents associated an aesthetics dimension to this element. This indicates the personal motivations to express themselves by adding elements in the front façade. Generally, the height varies from 1.90 to 2.5 m. The material used for this purpose is mainly concrete and limestone, and prefabricated concrete units.

The other main external alteration was adding ceramic titles to the front façade, as was done by five subjects. The main reason for such activity, as mentioned by the subjects, was maintenance. This suggests that the original wall surface, (of material), suffered maintenance problems and was expensive or difficult to clean. As

indicated earlier (see section 6.1.2) the author observed some cracking and peeling on the exterior, meaning that the original materials were not suited to the environmental conditions.

6.9.3 Landscaping

Actions categorised as soft landscape were carried out and appeared in the subjects' answers (Table 6:11). This category includes all alterations that were added to the surface of the original yards. Three main alterations were recorded: adding a porch, adding steps, and constructing paths. In the original plan, a shaded area was ignored, such an area could be used in the evening for sitting in or as a play area for children who should be protected from strong sunlight. Adding such elements will enhance the appearance of the house. In nearly all cases, the addition of a pergola to the building took place in the front yard (Figure 6:3). The second advantage, as cited by ten respondents, is providing fruits for the family.

Alteration	Freq.	Reasons	Freq.
Adding pergola	25	Providing a shaded area Providing fruits for family	15 10
Adding steps	15	Easy movement	50
Constructing path	14	Protecting external walls For afternoon sitting Easy to move	10 12 7

Table 6:11 Soft landscape alterations

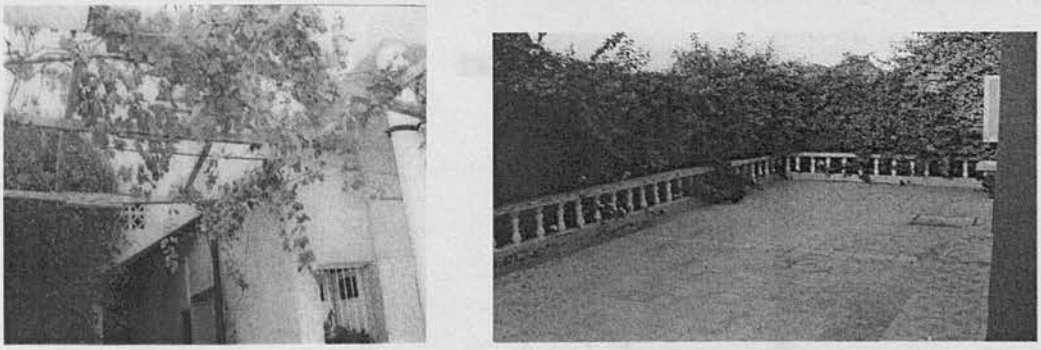


Figure 6. 3 Landscaping alterations. (source: the author)

6.10 Internal alterations

This category includes all the alterations that took place within the dwelling, it includes: adding spaces to the original space, converting the original spaces,

removing features, and internal enhancement.

6.10.1 Internal additional alterations

Adding new space to the original one could be found in the guest room, in the living room and in the kitchen. (Table 6:11). Nearly half of the respondents add a new space to the original space of the guest room (see Figure 6:4). The reason cited is the shortage of space in this element. As stated before, male social activity takes place in the guest room, while social family activities occur in the living room, as well as in the kitchen, therefore, it can be stated that the shortage of space is the major reason for adding new spaces to these three elements.

Alteration	Freq.	Reasons	Freq.
Adding space to guest room	18	Not enough spaces Guest's comfort	18 16
Adding space to living room	10	Not enough space Family comfort Social considerations	10 9 8
Adding space to kitchen	6	Not enough space	10

Table 6: 12 Internal additions

The significant change noticed is adding space to the original guest room. The main reason for that, as cited by the respondents is that the original space is not enough for social activities. The other reason which pushes them to add space might be using such a space for sleeping, for both family members and their relatives when they visit the family.

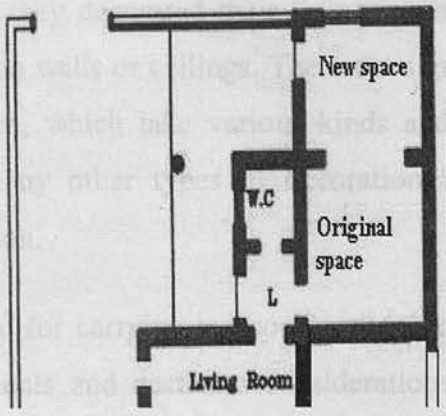


Figure 6. 4 Indicates the new space added to the original guest room space.

The other space which was affected by such an addition is the living room space. Because the household needed more space, therefore it can be assumed that the main

reason for adding space to dwelling elements is due to the shortage of space, especially in the guest room, living room, and kitchen.

6.10.2 Conversions

Thirteen subjects converted the kitchen to a bedroom because they needed more space and the space which was used as the kitchen was not adequate for its purpose. As explained previously, it includes preparing food for social events and as a social space for women. Because the household still needs a kitchen space, it can be assumed with some certainty that these respondents add more space to the dwelling as a functional space.

Alterations	Freq.	Reasons	Freq.
Converting kitchen to bedroom	13	Need for more space Kitchen space is not suitable	13 7
Converting bathroom to lobby	12	Need for another circulation access	10
Converting guest room to bedroom	3	More space Family comfort	2 1
Converting bedroom to living room	5	Visitors space Family comfort	4 3

Table 6: 13 Conversions

6.10.3 Internal decoration alterations

The third set of internal actions are related to decoration Sixty-two per cent of respondents reported that they decorated their living room and guest room. These activities could be found on walls or ceilings. The most significant material used for such decoration is gypsum, which take various kinds and shapes. The researcher noticed that there are many other types of decoration activities which are not included in this investigation.

The main reasons reported for carrying out such activity is, as mentioned in Table 6:14, for social requirements and aesthetic considerations. As mentioned before, many social activities occur in these two spaces, therefore, most of the respondents tend to give out certain social messages through such actions.

Activity	Freq.	Reasons	Freq.
Decoration on living room walls or ceilings	27	Aesthetic considerations Social requirements	25 18
Decoration on guest room walls or ceiling	25	Aesthetics requirement Social need	12 10

Table 6:14 Internal decorations

6.11 Other minor alterations

The third category of alterations is indicated in Table 6.15 with the reasons given for each activity by the respondents.

Activity	Freq.	Reasons	Freq
Fixing steel bar for windows	25	Family safety	20
Changing water supply pipes in kitchen	18	To have better services Protection for the house	18 10
Changing water supply pipes in bath room	18	To have better services Protection for the house	18 8
Changing ceramic tiles in the kitchen	18	Beauty Easy to clean	16 14
Changing ceramic tiles in the bath room	18	Beauty Easy to clean	14 14
Fitting electrical fan	10	Family comfort	10
Fitting air conditioning	7	Family comfort	6
Adding an arch	6	More ease in circulation Beauty	4 3

Table 6:15 Other minor alterations

Although these alterations do not fall strictly into the definitions for alterations that were established for this research, the author includes them here because they offer insight into how people have modified the house to suit their requirements.

A very common minor alteration was the addition of bars to the windows. As stated before, large windows are a recent introduction to the Libyan house, and clearly people do not feel entirely comfortable with this feature, whereas a small window in a thick wall automatically provides symbolic and actual protection.

The second category of minor alterations which take place inside the dwelling were changing the water supply pipes for both the kitchen and the bath room. This action could be considered as a maintenance activity. Because of the unsuitability of the current dwelling to the environmental conditions, as discussed previously (see section 6.2.4), ten respondents have fitted air conditioning in their houses.

6.12 Cost of alterations

To determine the economic value of activities from the respondents' view, it was necessary to determine their cost, according to owners' resources. Therefore the technique used in this research was to invite the subject to sum up his opinion of the cost in a subjective rather than numerical way, and relate them to the importance of the activity (see Chapter Five, section 5.3.6). A very important and very expensive alteration represented the highest point on the scale, while an unimportant and less expensive response rated as lowest on the scale.

6.12.1 Very expensive alterations

From the survey, six alterations were considered very expensive these are: shown in Table 6.16.

Alteration	Freq.
Adding rooms on the roof	20
Adding a staircase	18
Converting the kitchen	17
Adding a storey on the roof	9
Changing water supply pipes in the kitchen	7
Converting guest room	3

Table 6:16 Very expensive alterations

It is not surprising that all respondents who added a full storey to the roof considered this to be very expensive, as did all who added any rooms to the home. The cost of such alterations necessarily includes building a staircase, then modifying the parapet. It can take years before the new space is available for occupation. The fact that only 18 out of the 24 who added a new staircase nominated this as a costly activity, indicates that many respondents want an independent building but it seems as a sub-operation, carried out to achieve more space on the roof.

Although changing the kitchen water supply pipes constitutes a less expensive category, these may have seemed expensive to the home owner, in that they would have expected the original pipes to perform adequately. The cost in changing them represents paying from household resources for removing kitchen tiles, changing the pipes then fitting new tiles on the walls as such alterations need a lot of money.

6.12.2 Very important alterations

The second category for alterations is the importance of the activity to the owners. From the survey, eleven alterations were considered very important (Table 6:17). Twenty-six of the subjects considered modifying the front fence as very important. Such modifications were identified by many researchers as a personal attitude for identity, many residents use it to express themselves and convey information to their neighbours about their social status. The second most important activity is adding rooms on the roof. This offers more space to the family and, at the same time, increases the house value over time. The third most important activity is adding a store (nineteen respondents, although twenty-six in total made this change). This element is neglected in the original design and is felt important to all Libyan residents. The fourth important alteration is modifying the guest room.

Alteration	Freq.
Modifying fence	26
Adding rooms on the roof	20
Adding store	19
Modifying guest room	13
Adding staircase	10
Adding new story on the roof	9
Modifying parapet	6
Converting bath room to kitchen	3
Decoration for guest room	3
Modifying living room	3
Adding kitchen	3

Table 6:17 Very important alterations

6.12.3 Very important, very expensive actions

According to the scales used to measure the economic and functional value of the alterations, five alterations emerged as being very expensive and very important (Table 6:18). Seventeen subjects considered adding rooms on the roof as a very important, very expensive activity. This indicates the deficit of space within the dwelling. Fourteen respondents considered adding a staircase to the dwelling as a very important, very expensive activity, for the same reason, because it gives access to a new useful roof space. It allows more spaces to be added or even allows people to use the roof, especially during the summer nights, for sleeping or relaxing. This

can only be achieved after modifying the parapet to offer some privacy to the family members.

Very important, very expensive alterations	Freq.
Adding rooms on the roof	17
Adding staircase	14
Modifying living room	12
Adding space to guest room	10
Adding new story on the roof	9

Table 6. 18 Very important very, expensive actions

6.13 Space syntax analysis

The aim of the current research is to investigate the social meaning of the spaces lived in Libyan public housing, and to make a comparison between the spatial significance of public housing before and after alteration. The investigation requires a tool which helps to understand space as a social construct, and therefore, makes use of space syntax, a technique developed by Bill Hillier. In this part of the research, an overview is given of the theory and how it works.

Space syntax is a graph-based theory used by many professionals to examine how the spatial layout of buildings, neighbourhoods and cities influence the economic, social, and environmental outcomes of human movement and social interaction. It is used to examine the spatial morphology of two patterns of public housing, comparing them with the same place after it has been changed and comparing the spaces before and after modification.

Space syntax analysis assumes that space has two properties: a two-dimensional or convex structure and a one-dimensional or axial structure (Hiller, 1982). To investigate a house, first of all a map must be prepared, showing all the spaces within the building. From the first map, a second map should be drawn, called an axial map which shows the routes between the house spaces. Then a justified gamma map is prepared, in which every space on the premises is assigned a depth value according to the minimum number of steps (i.e. distinct spaces passed through) that must be taken to arrive in the space, starting from the outside, or ''carrier'' space, (Hillier & Hanson, 1982: 149).

A justified gamma map is a graph in which spaces are represented by a circle and

permeability, or thresholds before these spaces, by lines. All spaces of the same depth value are lined horizontally above the carrier. The advantage of a gamma map is that it renders the basic syntactic properties of symmetry and asymmetry, it allows a form of analysis that combines the visual decipherment of pattern with procedure for quantification (Hillier & Hanson, 1982). In Hillier's theory, levels of space are tested by studying how space links and the routes of progression through space. These investigations give a sign of the importance of each space to the users and assist in defining the function of each space and of the building as a whole.

Spaces immediately accessed from the carrier space are those at the first level and are called 'shallow'. This level in Libyan housing is usually used by men, whereas the deeper levels of the house are the more private family spaces, which emphasises that the spatial structure relates to the social structure as suggested by Rapoport (1969).

These stages of mapping create a permeability graph, a configurational description that consists of justified lines and circles which map the permeability or accessibility of the house spaces. Three properties that are apparent in the permeability graph are scale, integration and relative asymmetry. Scale is the total number of the nodes or bounded spaces contained in the configuration, indicating the size and spatial requirements of the residential unit. Integration includes two components: the number of rings and the number of communal spaces. Rings occur when spaces are connected into circuits that allow a single space to be accessed by more than one route.

This results in short cuts between spaces that truncate the route of access. Communal space functions to integrate other types of spaces by connecting them together in ways that create opportunities for social encounters and participation in group activities, as a result, well integrated households often utilise greater number of rings and communal spaces (Dawson, 2002).

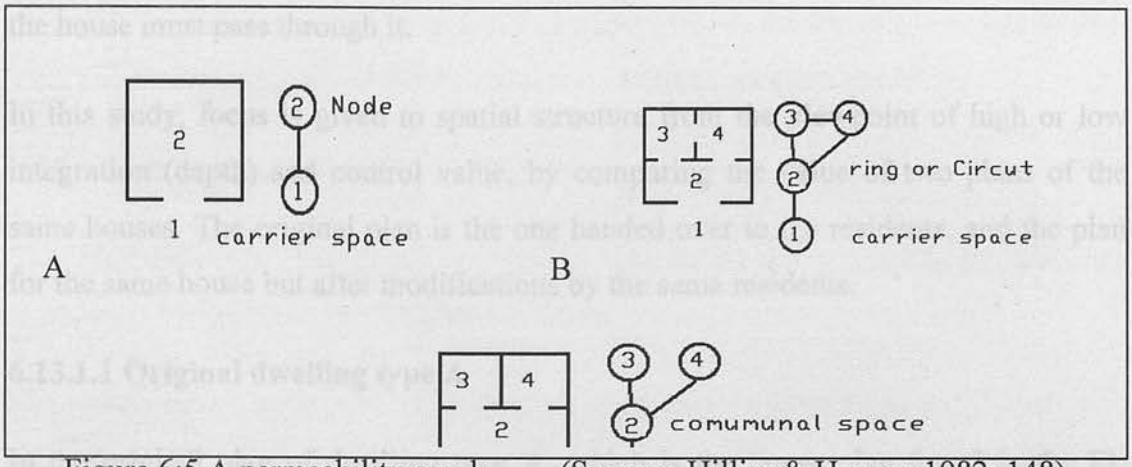


Figure 6:5 A permeability graph (Source: Hillier & Hanson 1982: 148)

6.13.1 Mean depth and relative asymmetry

To measure mean depth (MD) by using an equation developed by Hillier and Hanson (1984, p. 108), the MD of each space is calculated by assigning every space a depth value based on the trip lengths needed to move from the current space (not necessarily the carrier space) to all others in the dwelling. These trip lengths are then summed and divided by the total number of space in the house. Then relative asymmetry is calculated as follows:

$$RA = \frac{2(MD - 1)}{K-2}$$

Where MD is the mean depth and K the number of spaces in the system. This gives a value between 0 and 1, with low values indicating a space from which the system is shallow, that is, the space which tends to integrate the system, and high values indicating a space which tends to be segregated from the system. Relative asymmetry can be considered as the measure of integration.

Because RA values can vary considerably across dwellings of different sizes, it is necessary to convert them into a measure of real relative asymmetry (RRA) using a table of constant provided by Hillier and Hanson (1984: 112). The resulting (RRA) values are either greater than or less than one.

In traditional Libyan houses, as stated by Abdalla (1998) it is usual to find the men's quarter on a shallow level, because it has a direct contact with the carrier, or public space. The family domain is then on the deepest level and between the deepest and most shallow, there is the courtyard function as the control space, a central space has high control over its surrounding spaces (rooms) because all further movement into

the house must pass through it.

In this study, focus is given to spatial structure from the viewpoint of high or low integration (depth) and control value, by comparing the value of two plans of the same houses. The original plan is the one handed over to the residents, and the plan for the same house but after modifications by the same residents.

6.13.1.1 Original dwelling type A

In the original plan of dwelling type A, which is the house plan found in the El-Karama, Gut el-shaal, el-Drabi neighbourhoods), twelve spaces were assigned a depth value, starting from 1 to the carrier space, to twelve for the back yard space (Figure 6.6). From the gamma diagram, four levels appeared. Level one included the

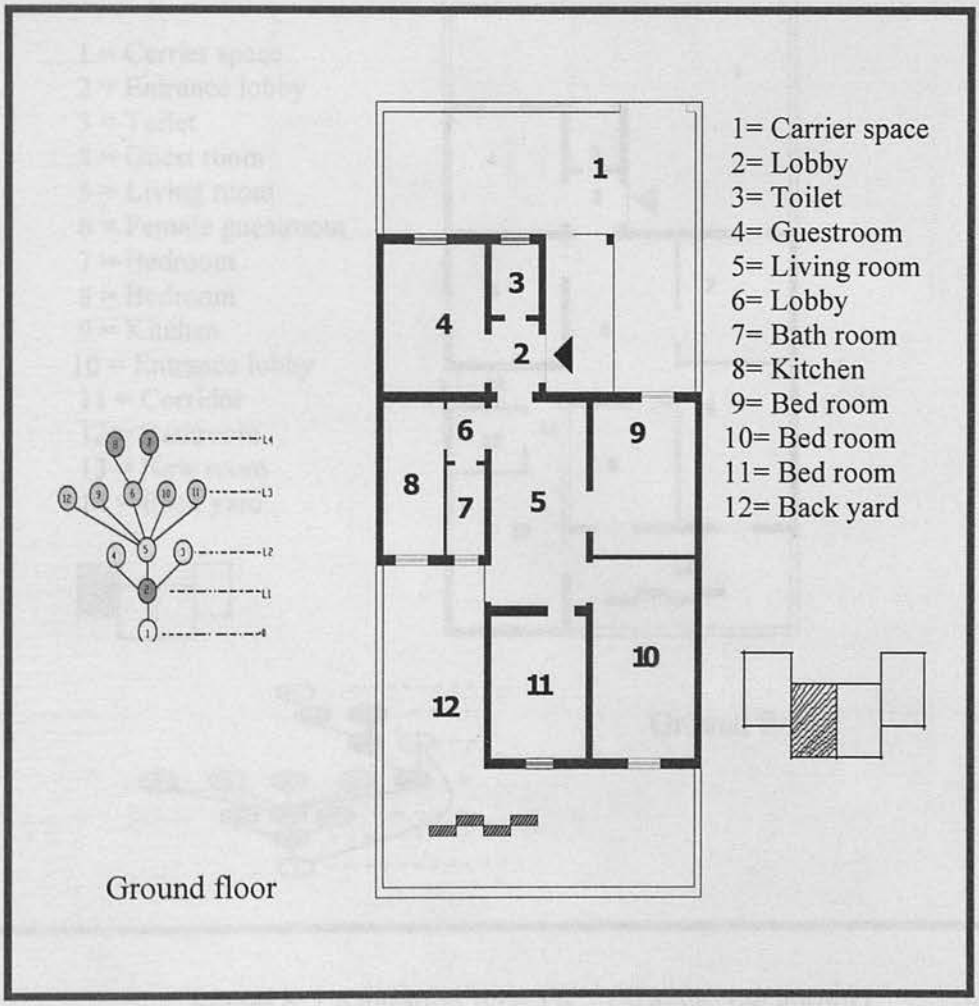


Figure 6:6 Original plan of dwelling type A
(Source: the author).

entrance lobby, this space serves as the main communal space for all the house, and controls the circulation to the guest room which is found at the second level

of space. On the same level, which is a shallow area, is the living room, which then works as a communal space for the other two levels to the back yard.

6.13.1.2 Alteration type 1A

This alteration type was found in dwelling type A. In this alteration, no additions were made on the roof. The additions included adding a new entrance and

two rooms in the back yard, additionally converting the internal space (Figure 6.7) increasing and a new ring was added to the building.

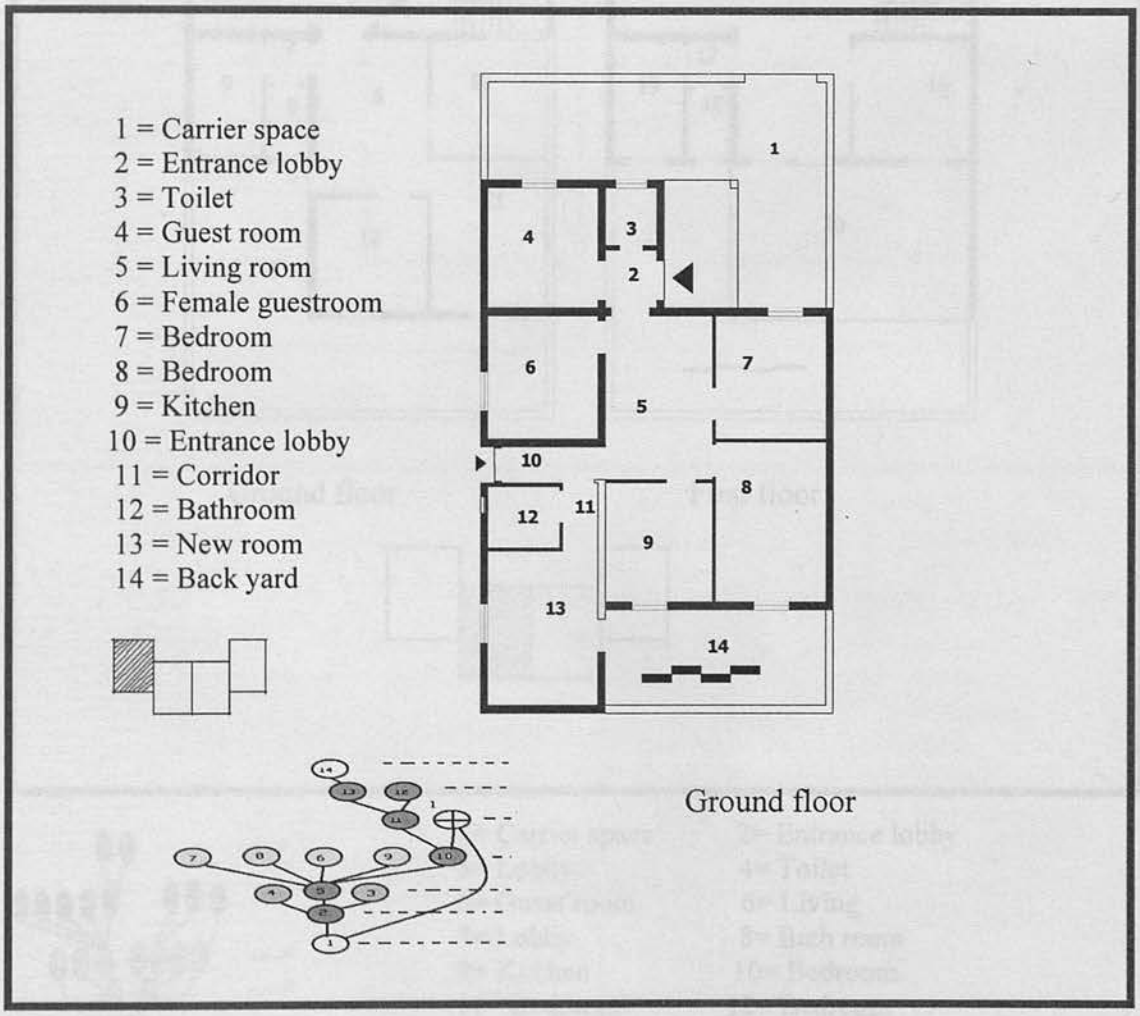
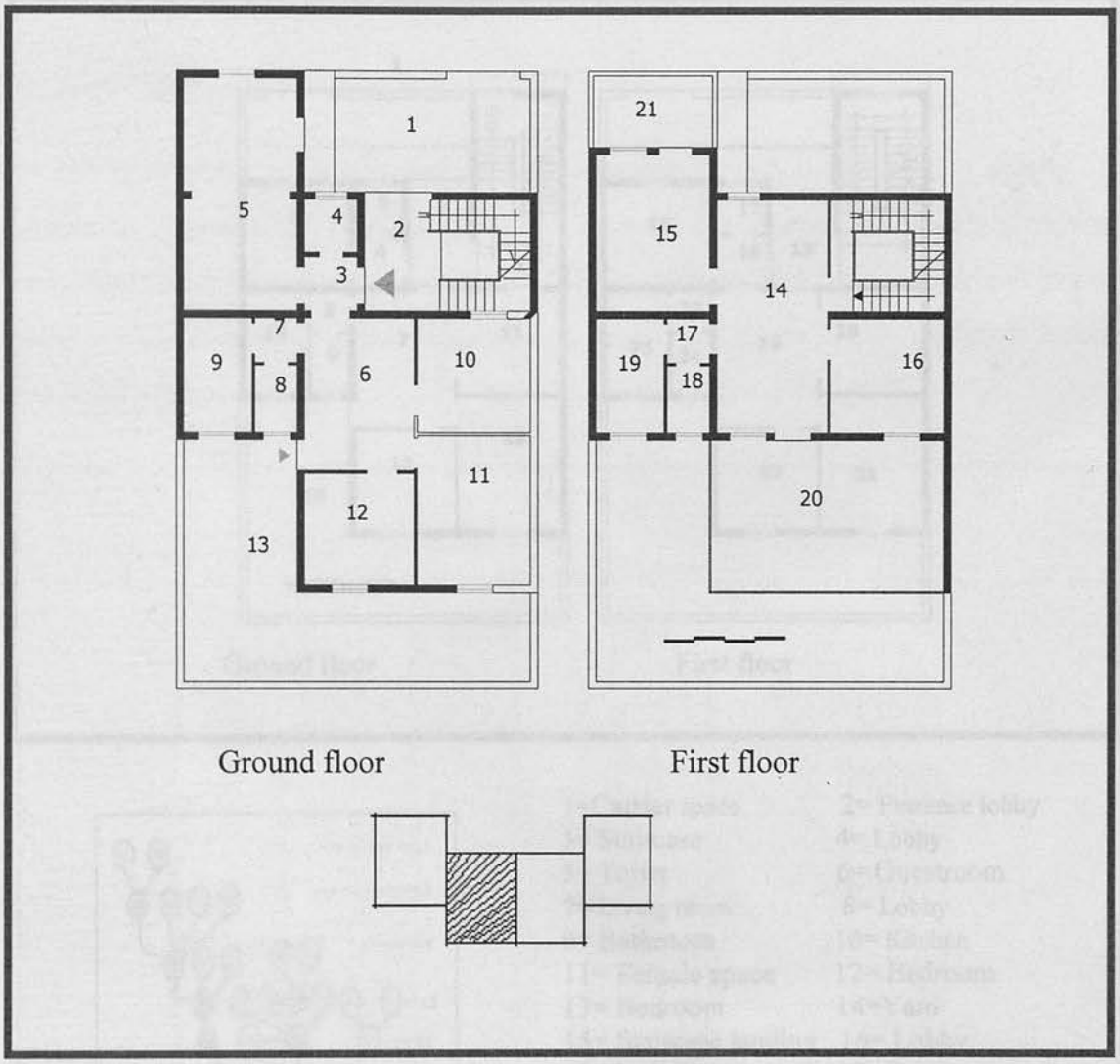


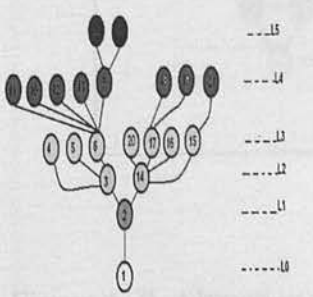
Figure 6:7 Alteration type 1A (Source: the author).

6.13.1.3 Alteration type 2A

This alteration type was found in el-Drabi neighbourhood in dwelling type A. The second example under analysis experienced changes on the ground floor

and on the roof as well (see Figure 6:8). This alteration type was found in the el-karama neighbourhood, A-type dwelling. One carrier space was designated in the front yard of the dwelling, at the same time, a new space was added to the guest room in the front yard. Twenty-one spaces were connected by a staircase built in the front yard.





1= Carrier space
2= Entrance lobby
3= Lobby
4= Toilet
5= Guest room
6= Living
7= Lobby
8= Bath room
9= Kitchen
10= Bedroom
11= Bedroom
12= Bedroom
13= Back yard
14= Living room
15= Bedroom
16= Bedroom
17= Lobby
18= Bedroom
19= Kitchen
20= Balcony
21= Balcony

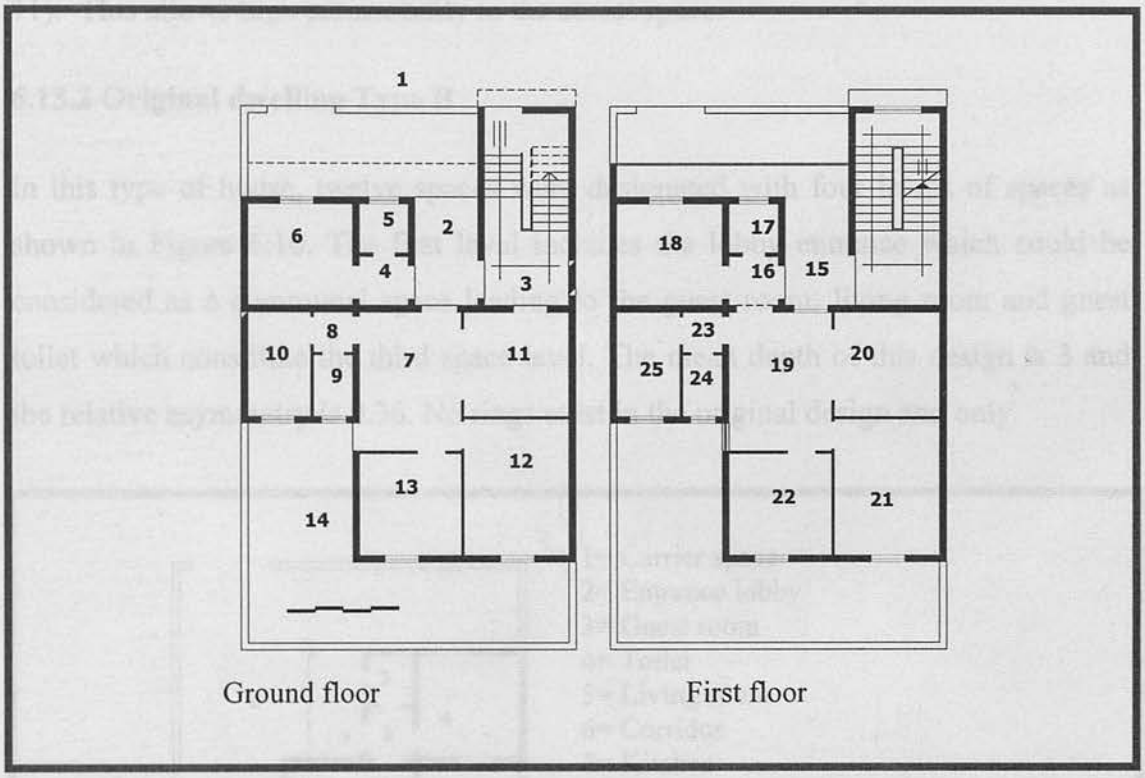
Figure 6: 8 Alteration type 2A (Source: the author).

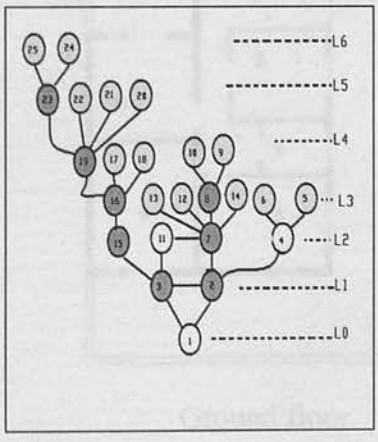
The gamma graph shows how five levels were created in this dwelling, two

spaces in level one, five in level two, two in level three, nine in level four, and five in level five. The MD for this graph is 3.6 and the RA is .27.

6.13.1.4 Alteration type 3A

In this alteration, as shown in Figure 6:9, a new floor was added on the roof





1=Carrier space
2= Entrance lobby
3= Staircase
4= Lobby
5= Toilet
6= Guestroom
7= Living room
8= Lobby
9= Bathroom
10= Kitchen
11= Female space
12= Bedroom
13= Bedroom
14=Yard
15= Staircase landing
16= Lobby
17= Toilet
18= Bedroom
19= Living space
20= Sitting space
21= Bedroom
22=Bedroom
23= Lobby
24= Bathroom
25= Kitchen

Figure 6: 9 Alteration 3A (Source: the author).

and an enclosed vertical circulation element which give access between the ground and first floor as well as from outside the dwelling. From the visual analysis of the

gamma graph, six levels appear. The mean depth of the altered dwelling is significantly increased to 3.3. This graph also indicates that there are eight communal spaces, instead of three in the original graph.

Another important factor emerged in this graph which is a ring that connects the entrance and circulation spaces to the spaces used by the women (spaces 2, 3, 7 and 11). This allows high permeability to the social space.

6.13.2 Original dwelling Type B

In this type of house, twelve spaces were designated with four levels of spaces as shown in Figure 6:10. The first level includes the lobby entrance which could be considered as a communal space leading to the guest room, living room and guest toilet which constitute the third space level. The mean depth of this design is 3 and the relative asymmetry is 0.36. No rings exist in the original design and only

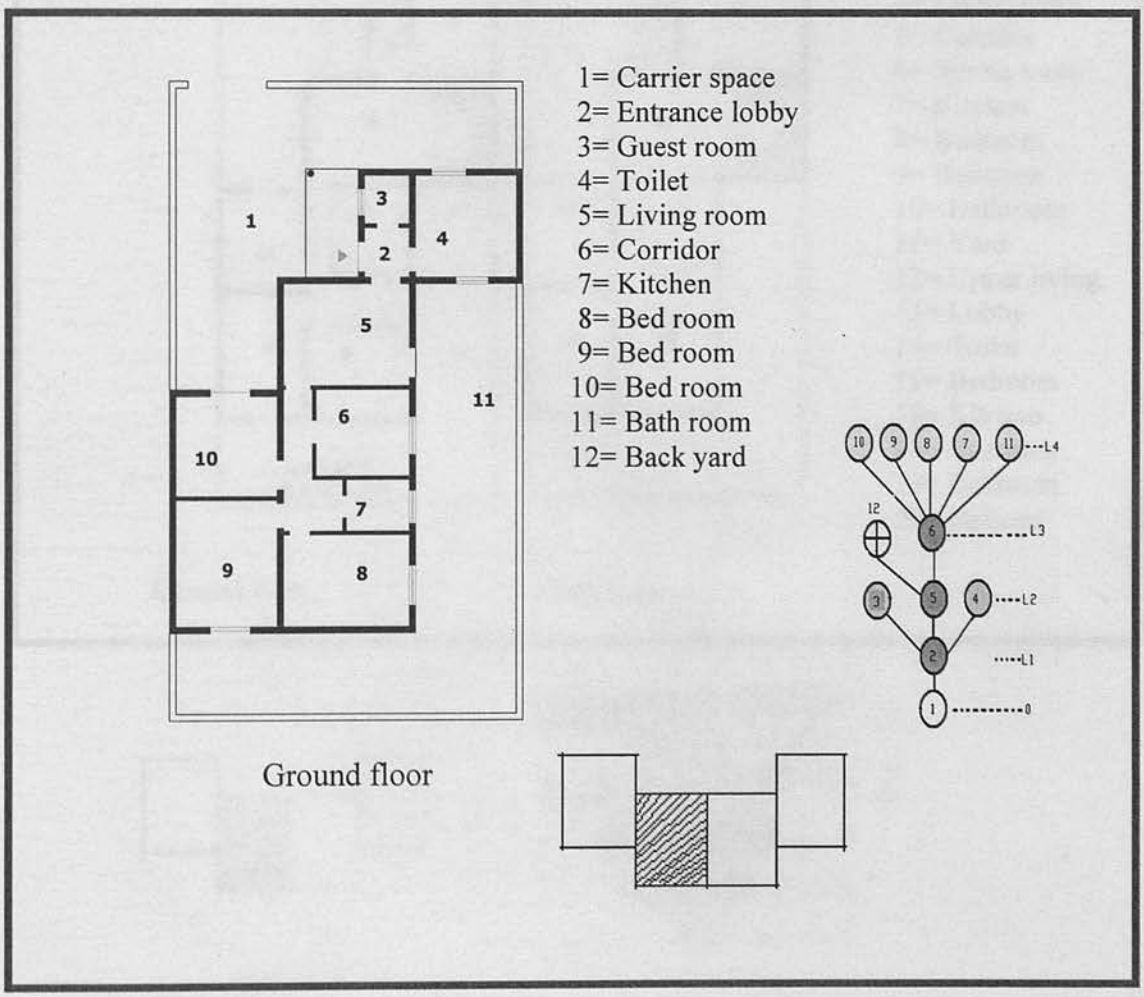


Figure 6:10 Dwelling type B, the original plan. (Source: the author)

three communal spaces are designated.

6.13.2.1 Alteration Type 1B

This alteration was found in el-Drabi neighbourhood of the dwelling type B. In this alteration (see Figure 6:11) a staircase was added but in the back yard and a new flat was added on the roof. In spite of the addition of ten new spaces, the number of levels remains unchanged at four. However, as a great number of rooms occupy the deepest level, the mean depth is increased to 3.1 the relative asymmetry decreased to .22.

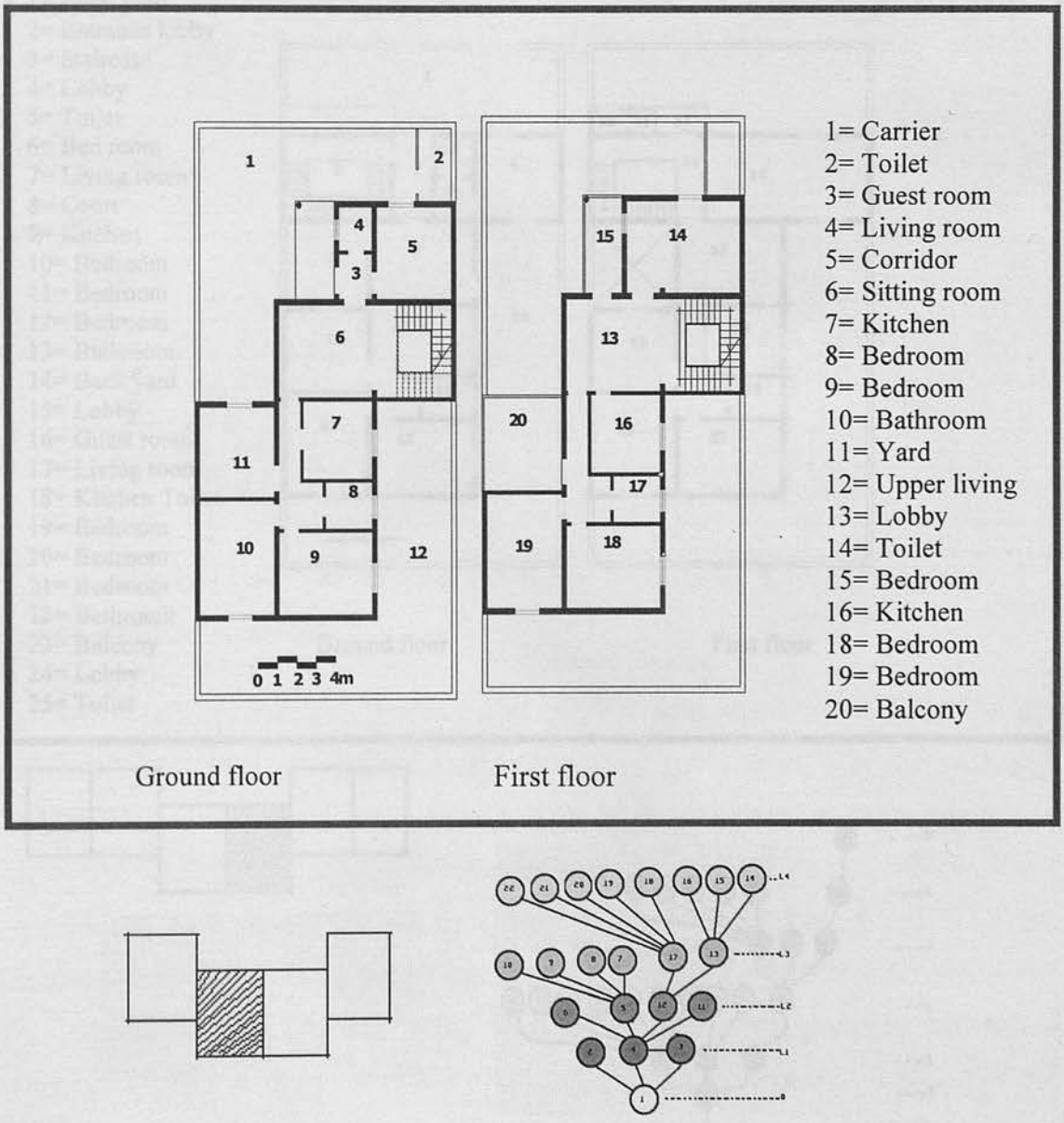
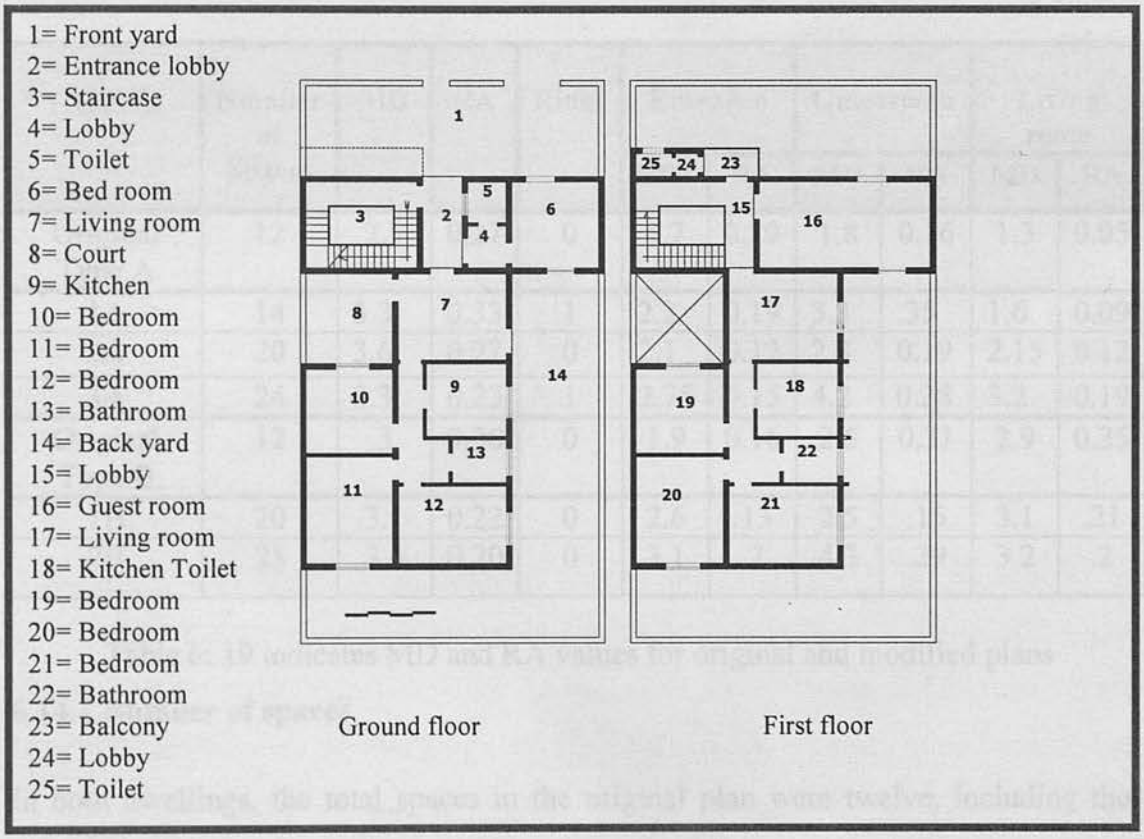


Figure 6: 11 Alteration type 1B (Source: the author)

6.13.2.2 Alteration type 2B

The owner of this dwelling added a new flat on the roof and almost the same spaces, which in the original ground plan, were added on the roof. Because of adding the staircase in the front yard, new space was created between the bedroom and the staircase in used as court yard (space number 8). Twenty-five spaces were created in the dwelling. From the visual analysis of the justified gamma graph, there are six levels of the spaces, and no rings were created in the changes which were carried out by the owners. The mean depth was 3.4 and relative asymmetry .20



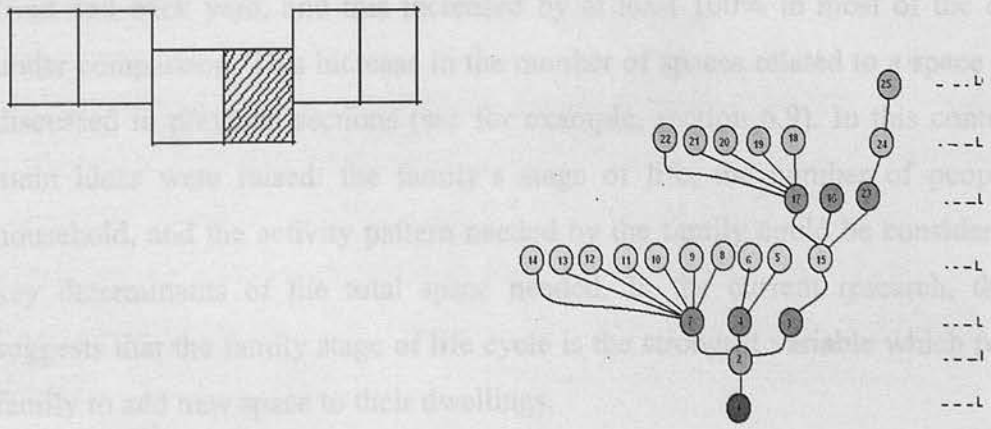


Figure 6:12 alteration type 2 B (source: the author)

6.14 Summary of space syntax analysis

In order to collate the preceding findings and highlight the general trends, Table 6:19 shows a comparison between the number of spaces, values for MD and RV, and the number of rings of original dwelling type A and B and their typical alterations. Further to the information already provided, the table shows the MD and RV values of the home plans, calculated separately for the entrance, men's guestroom and family living room. The reason for this is that much of the theory and understanding of privacy as the main motivations for alteration, leads to an expectation that the MD and RA of these specific spaces are significantly increased.

HOUSE	Number of Spaces	MD	RA	Rings	Entrance		Guestroom		Living room	
					MD	RA	MD	RA	MD	RA
Original Type A	12	2.5	0.27	0	1.7	0.29	1.8	0.16	1.3	0.05
1A	14	3.3	0.33	1	2.2	0.19	3.3	.35	1.6	0.09
2A	20	3.6	0.27	0	2.1	0.12	2.8	0.19	2.15	0.12
3A	24	3.3	0.23	1	2.75	0.15	4.2	0.28	3.2	0.19
Original Type B	12	3	0.36	0	1.9	0.16	2.5	0.31	2.9	0.35
1B	20	3.1	0.22	0	2.6	.13	2.5	.15	3.1	.21
2B	25	3.4	0.20	0	3.1	.2	4.3	.29	3.2	.2

Table 6: 19 indicates MD and RA values for original and modified plans

6.14.1 Number of spaces

In both dwellings, the total spaces in the original plan were twelve, including the front and back yard, and this increased by at least 100% in most of the dwellings under comparison. This increase in the number of spaces related to a space deficit as discussed in previous sections (see for example, section 6.9). In this context, three main ideas were raised: the family's stage of life, the number of people in the household, and the activity pattern needed by the family could be considered as the key determinants of the total space needed. In the current research, the author suggests that the family stage of life cycle is the strongest variable which pushes the family to add new space to their dwellings.

6.14.2 Mean depth

The mean depth for original dwelling plan type A is 2.5 and 3.1 for original dwelling plan type B. Generally, the mean depth for all modified dwellings increased (as shown in the previous table). Increases in all cases show that the dwellings as a whole are being moved to have less contact with carrier space (public realm). In other words, dwellings are moving towards greater privacy. In the language of space syntax theory, the dwelling design is more integrated than usual. As explained in Chapter One the social norms for the Libyan family are that they prefer to have separate spaces for males and females. Therefore, wherever, there are conflicts in circulation or in the position of dwelling spaces that cause upset, residents will try to find solutions by altering the space or inventing special rules which control such activity.

As shown in the previous table, the values of mean depth for the guest room space for the modified dwellings varied from 2.5 for the original dwelling design type A, raised to 4.8; more privacy was needed in this space which needed more segregation from other dwelling spaces. The same situation can be noticed in living room space.

6.14.3 Relative asymmetry

The relative asymmetry in the original plan of dwelling type A is .38 and .31 in dwelling type B. These values are related to the average value for the dwelling and comparing it with the same value for the modified plans, we can see that the values have decreased for all the dwellings, except dwelling 3A. This might be because the modifications which were carried out inside the dwelling, make the spaces less than the original plan which affects the mean depth in general.

In the original spaces, the entrance for dwelling type A, the RA was .35 and compared to the value for the same space after it was modified, it is obvious that the value was increased in all the modified dwellings. This indicates that there is a propensity for more segregation of these spaces. On the other hand, for the guest room space in the modified dwellings, the value of this space decreased, except in dwelling 3A.

6.14.4 Rings

Depth and rings are the basic dimensions of space configuration, and convex and axial organisation is its architectural dimensions (Hanson, 1998). From the previous analysis and from justified graphs, it is clear that a ring was added. This ring connects the main lobby, living room and the carrier space. The aim of this ring, it seems is that it serves the circulation between the carrier space and the living room to avoid the main lobby of the house, especially when there are female visitors, by avoiding having them pass through the main lobby. These satisfy both family members' and visitors as asocial norms dictate.

6.15 Discussion

The data collected and analysed indicate a range of significant findings. These are summarised as follows:

- The Libyan family pattern is still based on extended families, where grandparents and newly married sons share their dwelling with the home owners.

- In spite of the improvement in the individual income for Libyan families, compared with other African countries, many people cannot purchase land to build new houses for their sons when they marry and want to establish their own families. This has led many home owners to add new flats on the roof. Since the mid 1980s, the local land market has no longer been controlled by the government and there was no new area of land division allocated for new houses. This has had an effect on land prices which have risen in most of the Tripoli region, for example, in Janjor district, the price per square metre rose from 19 LD in 1975 to 200 LD in 2001 (Zedan, 2003).

- Comparing the previous and current dwelling features, the courtyard element has disappeared from the current dwelling. Instead, front and back yards appears in the current dwelling. One other main difference concerns the windows, which are much larger than those in the previous dwellings (see Figure 6:13). This, of course, has had an effect on the internal climatic environment of the dwelling, as well as the privacy needs of the residents.The major difference here is that in the traditional dwellings, they

were decorated (see Figure 6:14).

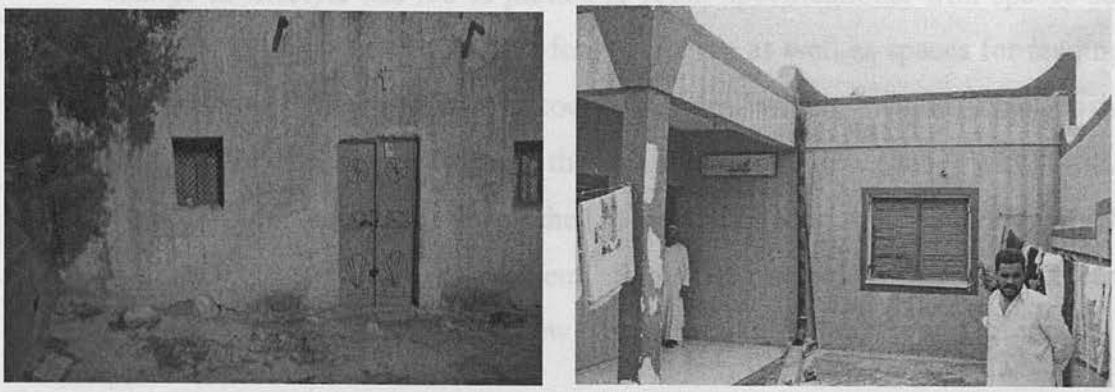


Figure 6:13 Differences between old and new opening (source: the author)

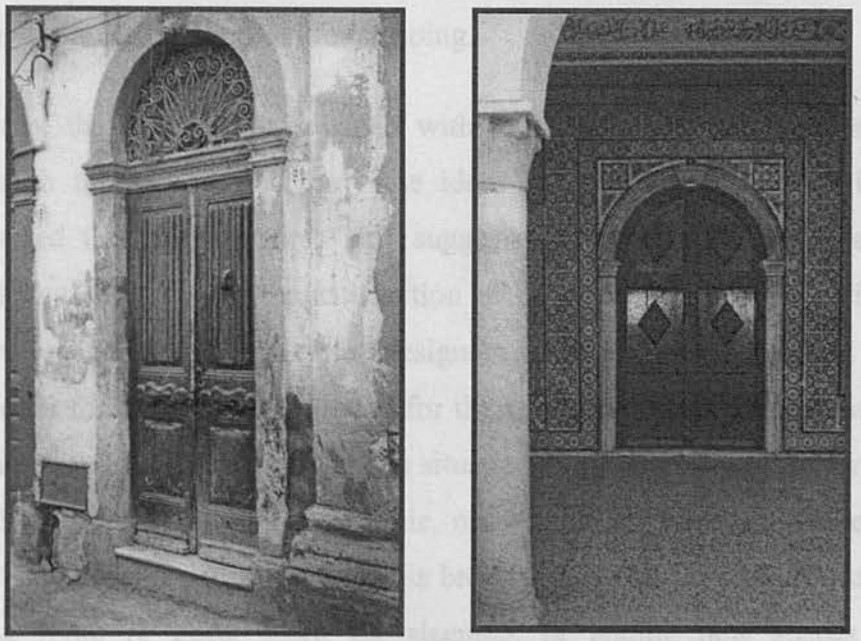


Figure 6:14 Traditional doors of dwellings in Tripoli region (source: the author)

- Most of the materials used in the previous dwelling were local materials, assembled using a local system for building, for example, the thickness of the walls was not less than 40cm. This had two advantages, as a load-bearing structure with a high thermal mass that insulated against heat gain and loss. In the current house, the maximum thickness is 25cm and the roof is 13cm, made from reinforced concrete. These elements absorb the heat during the summer day and release it at night.

- Most of the sample evaluated the rooms in their previous dwelling as small in area, compared with the current one. In the traditional dwelling, there were no specific functions for most of the rooms, except the kitchen,

guest room and bathroom. On the other hand, in the current dwelling, the change in lifestyle has led to particular room specifications, with spaces set aside for dining, sleeping and for female guests, as well as spaces for reading and working. Because of the social changes, which includes changes in architecture, the sample affirmed their wish for these new spaces within their ideal house. In addition, they wished to have arches in their dwelling, which indicates an aesthetic requirement. Some of these changes were clear, especially by adding space and new entrances to the guests' area.

- In general, most of the sample was satisfied with the area and size of their dwellings, especially the bedrooms. In spite of that, many people used the living room and guest room for sleeping.

- Most of the sample was satisfied with level of privacy in their bedroom, although this may reflect only the ideas of the head of the family who answered the questionnaire. This suggests the need for a possible future investigation, covering the satisfaction of other family members with their private space. It is clear that the designers have recognised the need for one bedroom for the parents, a second for the sons and a third for the daughters, in line with Libyan culture, but this situation is not always satisfactory as the children grow older. If, for example, one of the boys reaches sixteen years old, he should be separated from his brothers and this might mean using the living room or guest room for sleeping, or adding new spaces to the dwellings.

- Most of the sample were satisfied with the external spaces. This satisfaction might be related to the chance to add other facilities to their dwellings.

- It was noticed that most of the sample were dissatisfied with the appearance of the neighbourhood from the point view of the external colour used for the houses. In addition, most were dissatisfied with the refuse disposal services and lighting.

- The five main causes of dissatisfaction with interior spaces were: the position of the guest room; the position of the living room; the area of the kitchen; the position of the main entrance to the guest room; and the position of the living

room to the guest room.

- Most of the subjects were dissatisfied with the current dwelling, in terms of its interior climatic comfort, the materials used and the thickness of the walls, compared to that of traditional dwellings. It is clear that the modern house construction methods are much less able to insulate against day-time heat and night-time cold, compared to the use of the central, open courtyard of the traditional dwelling which helped to ventilate, light and cool the dwelling. Changes that might be seen as a reflection of dissatisfaction include adding new openings to install air conditioning systems or using the roof for sleeping, especially during summer, which requires the owner to modify the parapet.

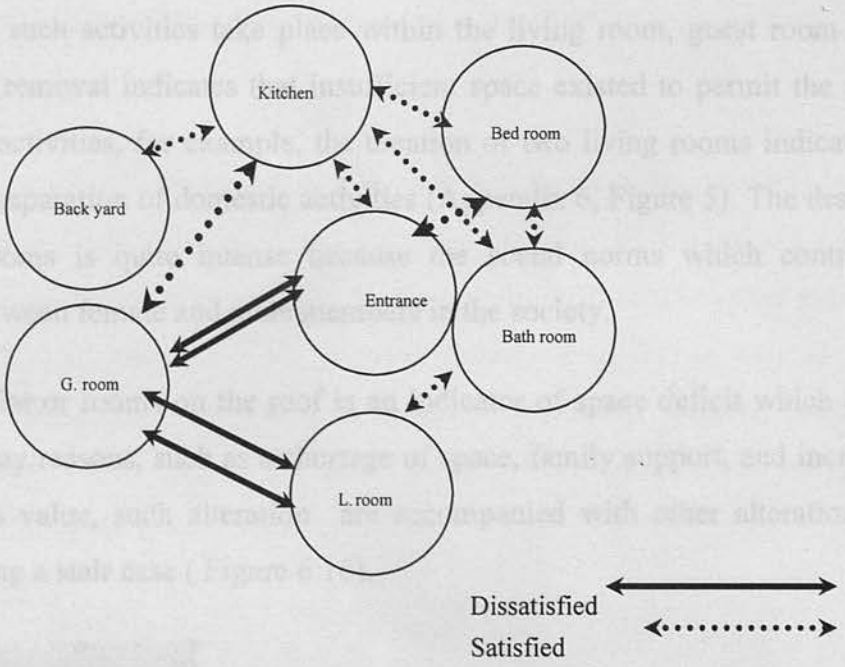


Figure 6:15 Indicates residents' satisfaction with the position of the facilities within the house.

In spite of dissatisfaction with the neighbourhood, most of the sample would not recommend it as a place to live, and they still carry out changes. This might be due to the shortage of housing preventing a move to another area, or due to a low income preventing the chance to buy land or a new house.

6.15.1 Alteration activities: explanation

In this section an attempt will be made to explain the alterations reported from the subjects as well as to predict the reasons for them, in two main sections. The first

one deals with alterations and the second deals with the themes of these alterations. Bearing in mind that these alterations hold many interpretations and dimensions such as for example, space deficit dimensions, privacy, personalisation, aesthetics, and control.

6.15.2 Space Deficit

Reasons for adding a flat or rooms could be considered as a space deficit. Increasing space tends to produce an increased physical separation of various domestic activities, resulting in more rooms. However, the separation of activities could be for the interaction between family members, interaction with visitors, or due to the nature of the activity. To increase the space, it does not mean necessarily adding a new space; it could be done by removing a wall between spaces within the dwelling, since most of such activities take place within the living room, guest room or the kitchen. Wall removal indicates that insufficient space existed to permit the formal separation of activities, for example, the creation of two living rooms indicates the desire for the separation of domestic activities (Appendix 6, Figure 5). The desire for two living rooms is quite intense because the social norms which control the interaction between female and male members in the society.

Adding new flat or rooms on the roof is an indicator of space deficit which can be related to many reasons, such as a shortage of space, family support, and increasing the dwelling's value, such alteration are accompanied with other alterations, for instance, adding a stair case (Figure 6:16).

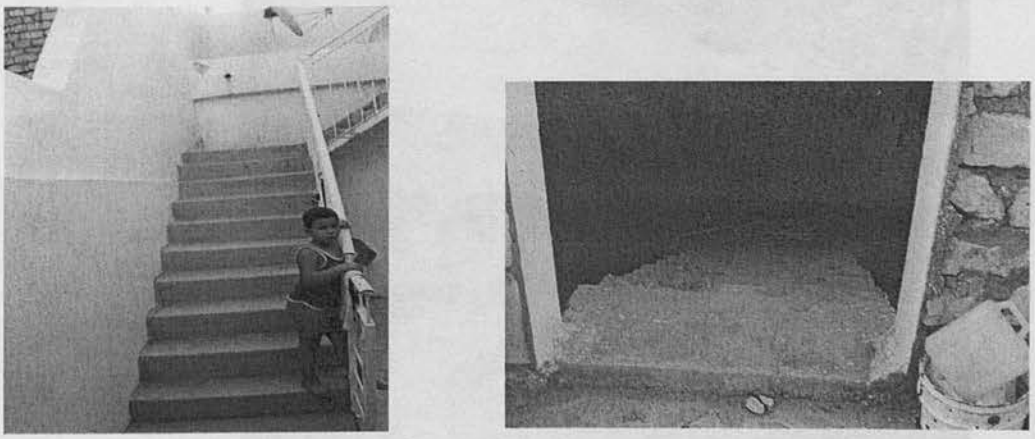


Figure 6. 16 Adding a staircase in the front or back yard (Source: the author)

Modifying the roof's parapet will allow the owner to use the roof for sleeping in

summer, even without adding rooms (Figure 6:17). The other advantage might be decoration as shown in the red circle.

Figure 6:17 Modifying the parapet (Source: the author)

6.15.3 Privacy

The second dimension is the need for privacy. Alterations can be classified into two types, external and internal alterations. Activities include: adding space to a guest room, or locating a guest room outside the main building, modifying the parapet or modifying the main entrance wall. Internal alterations could be noticed in the conversions to the living room space, as explained previously. Closing the halls in the main entrance wall is one of the alteration activities which can be observed in most of the dwellings (Figure 6:18).

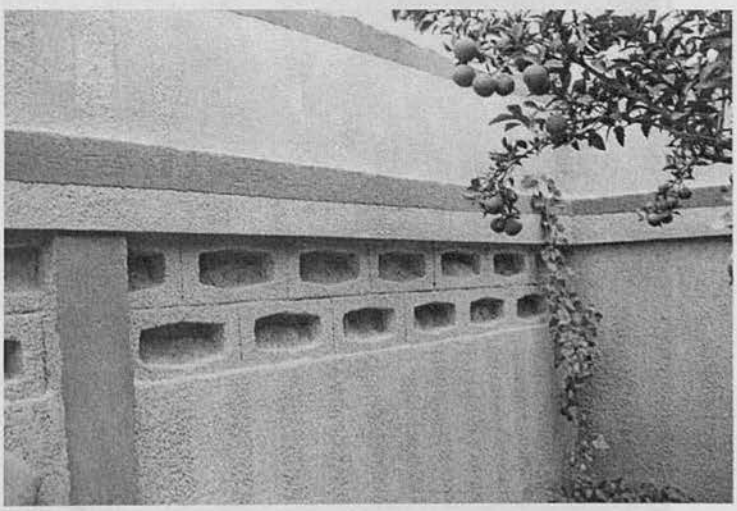


Figure 6. 18 Closing off the halls and increasing the height of the front wall (Source: the author)

6.15.4 Personalisation

As discussed in Chapter Two, one of the reasons for transforming a dwelling or the built environment is to personalise it. The need to reinforce the occupant's self-image can be seen in activities related to the general features of the dwelling.

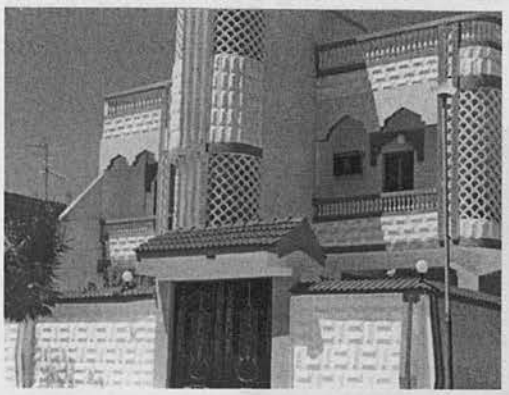


Figure 6:19 External dwelling façade represents the personalisation concept (Source: the author)

In the sample, personalisation could be seen as well in modification of the front wall as (shown in Figures 6.19 and 6:20). Bearing in mind that personalisation does not mean to be different because most of the sample (70%) of the subjects stated that they did not agree with the importance of the houses to be different.

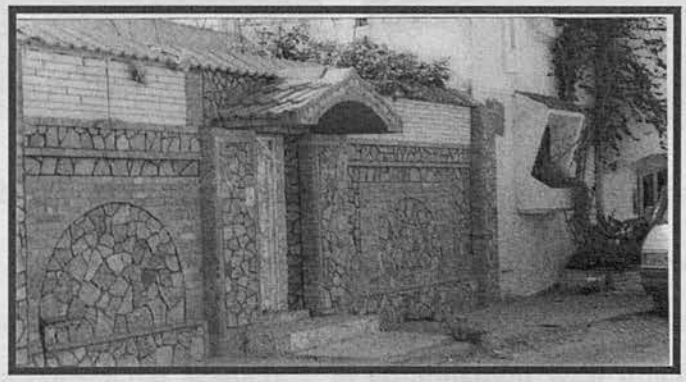


Figure 6. 20 Modifying the front entrance (Source: the author)

6.15.5 Aesthetics

The fourth dimension which can be observed in transformations carried out by owners is the aesthetics dimension, as shown in Figures 6:19 and 6:20 which show that the image is completely different from the original image of the dwelling, the answers the owners gave indicate that making things more beautiful, such as using arches inside and outside the dwelling (Figure 6:21) is important to them.

Figure 6:21 Using arches in the front façade (Source: the author)

Figure 6: 22 Front façade covered with ceramic tiles (Source: the author)

In addition, and as shown in Figure 6.22 the front façade covered with ceramic tiles the answer of the subject who carried out such work is: 'it is more beautiful than before.' Subjects considered aesthetics, in combination with functional advantage, for instance, it will be easy to clean and maintain the façade.

6.15.6 Activity centre

The most logical and straightforward reason for transformation was improving the dwelling as an activity centre, activity centre such as for social activity, family catering at social events or as a space for cooking. Social activity works as a push factor in carrying out transformations, especially in the guest room, living room, and

the kitchen.

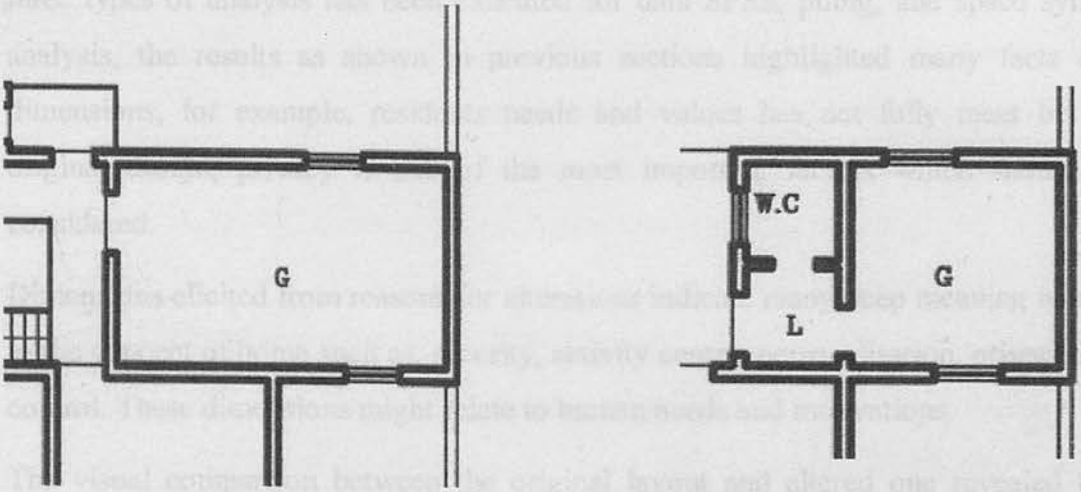


Figure 6:23 On the right, the original design space for the guest room and on the left, the space after it was transformed.

In general, the original kitchen layout was often unacceptable with insufficient space and cupboards, this pushes the owners to add or convert the kitchen space (as explained previously). To face the shortage of space at social events, most Libyans use their back yard for such activities.

6.15.7 Control

The sixth dimension in this discussion is control activities. Control as a concept is complex. In terms of security, it is clear that the owners carry out some activities which can be identified as a control, for example, they modify the height of the front wall (Figure 6:24); this activity in itself offers more privacy to the residents within the dwelling.

Figure 6:24 Increasing the height of the front wall (Source: the author)

6.16 Conclusion

three types of analysis has been executed for data SPSS, piling, and space syntax analysis, the results as shown in previous sections highlighted many facts and dimensions, for example, residents needs and values has not fully meet by the original design, privacy is one of the most important factors which should be considered.

Dimensions elicited from reasons for alterations indicate many deep meaning related to the concept of home such as, security, activity centre, personalisation, privacy and control. These dimensions might relate to human needs and motivations.

The visual comparison between the original layout and altered one revealed two main facts these are:

- The **growth** of the dwelling in terms of its size, space and form.
- The layout of Dwellings after altering become more **complex** than the original layout.

According to structuralism complexity and growth result of a transformation between deep structures. This concept will be discussed in part three of this thesis under the home as structure.

Introduction to Part Three

Responding to owners expectations and all the notions and themes that emerge from the research, which actually draws attention to the distinction between the dwelling as a physical entity, in terms of layout, design, statistics, , into home which is actually, holistically impress peoples with their culture, feeling and sense of belonging. Therefore, the author felt that the best way to conclude this to POE, is to go beyond statistical perspectives to deal with more subjective issues.

The best way to address it is to oversee it from theories that are seen by the author as more appropriate, in terms of providing almost full understanding. Maslow's model is about helping us to identify all needs that actually fulfil and drive people in the process of creating their own environment and structuralism theory which is a way of understanding, which goes beyond the surface meaning of alterations to deep structures and the meaning of the phenomenon of dwelling alterations.

This part will include three chapters, the first deals with the concept of home and alterations, the second with interpretations of dwelling, in more emotional terms, home within Maslow's model. The third, which is about structuralism, is introduced as a way of understanding the home as a structure within the Libyan cultural context.

The objective of this part is to introduce the concepts and theories which can be used to investigate and understand the home, to go deeper in its broad meaning of which designers need to be aware if they intend to produce homes more integrated to residents and their needs. Among the theoretical approaches, structuralism offers not a doctrine but a method to explain and seek laws that guide almost any phenomenon. It offers a bridge between the physical realm and its underlying principles (Ujam, 2005).

Chapter Seven: Home and Alterations

7.0 Introduction

The survey and analysis of the previous chapter suggest a field of discussion that is indicated but not completely explained by the alterations people make to their homes. In other words, the post occupancy evaluation has provided a range of observations that have led to a more theoretical discourse, and to try to identify what 'the home' signifies to its users.

The chapter opens by examining the 'concept of the home', firstly offering an overall definition of the term, then by investigating of the components identified in the literature as being relevant to it. This builds up a very user-oriented understanding, yet the tendency in Libya is for the designer, not the user, to determine the form and plan of the home. This gap between the designer and user is discussed as a way to explain the phenomenon of widespread home alterations observed in the previous chapters.

The chapter then looks further at the underlying nature of alterations, creating these within two categories, as process and result.

As mentioned previously that not all concepts related to the meaning of home and alteration were found in this research. In this chapter, focus will be given to the home as an entity in the built environment, as well as to how people give meaning to this term '*home*' and how people experience spaces and place within their homes. The aim is to understand this term in its broadest context as well as to evaluate it, believing that many layers are hidden in this term which may be difficult to deal with in totality in this research.

7.1 The concept of home

In this study it is necessary to understand the term *home* in its broader meaning for many reasons. Firstly, the alterations studied took place in the home. Secondly, most alterations within the homes changed the interior character, suggesting important issues related to the meaning of the home. House and home, these two terms have been used interchangeably (Rapoport, 1969, 2000). Thirdly, the home as a totality is considered as one of the elements being evaluated, therefore, it is relevant to understand the meaning that home offers to its users. This understanding of the concept of the home could help to explain the alterations carried out in the home environment.

There are other advantages to the concept of home. It can be studied empirically, and there are many existing theories about the concept of home and dwelling alteration (Despres, 1991; Goodchild, 1991).

It is not the aim of this research to make connections between these notions and alterations, or modifications carried out by the owners, because the concept of the home has a central role in everyday life, coupled with its rich social, cultural, historical, psychological and phenomenological significance, which is outside the remit of this research. In addition, it is difficult to define the concept of home, because of its numerous layers of meaning, therefore, it should be examined in terms of its parts as well as its whole (Moore, 2000).

There is a variety of definitions of the concept of home. Hayward (1977) provides an early categorisation of these definitions: home as physical structure; home as territory; home as locus in space; home as self and self-identity and home as a social and cultural unit. According to Hayward, home as a physical structure refers to a free-standing, detached unit with definable edges and boundaries to adjacent open spaces. A single dwelling unit is a common example.

Experiencing dwellings or, in a more emotional term as a home, is widely accepted as a universal human experience. Architects, sociologists and psychologists, deal with this notion, producing a wide diversity of definitions. However, a home is more than a dwelling, it is a way of creating a life that follows a set of cultural norms and behaviours in a specific geographic space (Smith, 1994).

Rullo (1987) summarises the approaches taken by psychological research into the concept of home people-home relationship, putting the focus on the role of the home interior in the human experience of dwelling. These approaches are:

- *Perception and evaluation of spatio-physical components*: Most researchers in this experimental research investigate the effect of architectural variables on human behaviour. The studies are concerned with people's perceptions and evaluation of domestic elements as a function of fixed and semi-fixed elements, such as furnishing arrangements, ceiling height, wall colour and so forth. The results tend to show which variables can facilitate or hinder users' goals and activities. Under this dimension, home could be defined as a location in which significant activities of daily life are conducted and to

which an occupant would apply this symbolically charged label (see for example, Seagert, 1985:289).

- *Individual differences in evaluation of and attitude to home interior*: In this approach, empirical results show that the inhabitants' evaluations of their dwellings, of the home interior models and of spatial functional areas of the houses, are based on aesthetic, personal and social objectives. People's conceptualisations and experience of their home environments are interpreted as closely linked to the social norms and cultural values of the group to which they refer or belong.

- *Sex role and dwelling experience*: In this theme, sex differences in mental, emotional, and behavioural patterns as related to the home interior are concerned mainly with privacy and social interaction. This, from an architectural point of view, could be related to an inside outside-dimension (Tognoli 1987).

- *Privacy and social interaction*: In this theme, privacy and its regulation through territoriality and space control, as well as social interaction, are two of the principle issues emerging in the study of the relationship between people and their living space. (Altman, Nelson and Lett 1972). Numerous definitions are given to space and place. In one of them, Buttimer (1980) views social space as a framework within which subjective evaluation and motivation can be related to clearly expressed behaviour and the external characteristic, of the environment. This type of space has two different components: objective and subjective components. The former signify the spatial framework within the lives of groups whose social structure and organisation have been conditioned by ecological and cultural factors. The latter denotes space as perceived by members of particular groups.

- *Personal meaning and experience of home*: In this approach, residents, place-identity, a sense of belonging and rootedness are considered to be centred particularly in the home. These and other concepts have been formulated in order to interpret people's feelings of 'attachment' to the dwellings. The role of the unconscious processes involved in the human experience of the physical and symbolic context of the home is emphasised by home and self identity. Such researches are based on intercultural and

cross-cultural analysis by comparing people's conceptualisation, and types of organisation and decoration of home interior among socio-cultural groups. Many studies have highlight and that home arrangement communicates inhabitants' social status and social identity as well as family style (Canter & Lee, 1974). Home, under this dimension, could be considered as a label applied voluntarily and selectively to one or more environments to which a person feels some attachment (Hayward, 1977).

The approach taken in this discussion is to see the home as a vehicle for enacting and handing down complex sets of cultural behaviour and family organisation. User satisfaction is thus contingent on the capability of the spatial layout of the home to allow such behaviour and organisation, and any layout that fails in this regard, will trigger feelings of stress and displeasure. This approach, therefore, combines many of the themes cited above, particularly personal meaning and identity which include many complicated dimensions. It goes further, however, in introducing culture as the core of home expectations and, therefore, satisfaction with the home seems to be difficult to achieve unless the users participated in their dwelling design.

7.2 Elements of the concept of home

With a wide variety of elements in the concept of the home, it is necessary to identify a framework showing the inter-relationships or classification of the elements. Without this framework, the number of elements become too large to analyse on an individual basis. Tognoli (1987) introduces five attributes of home: centrality; continuity; privacy; self-expression and personal identity; and social relationship. All of these attributes are related directly or indirectly to the physical environment of the home. Seven dimensions were suggested by (Somerville, 1997, cited in Moore, 2000); shelter; hearth; heart; privacy; roots; abode; and paradise (the ideal). Moore assumes that he based these on a phenomenological approach. Another classification (Kenyon, 1999) includes four elements of home: physical, temporal (relating to religious), social, and personal.

Golton (1997) mentions 18 elements in the home concept and states that in each element there may be other sub-elements. A paper by Sixsmith (1986), investigating the meaning attributed to home by a number of British university students, suggests a framework using qualitative as well as quantitative methods and lists 20 different meanings of home and her analysis indicates that these may be grouped under three broad categories: personal, social, physical (see Table 7.1, 72).

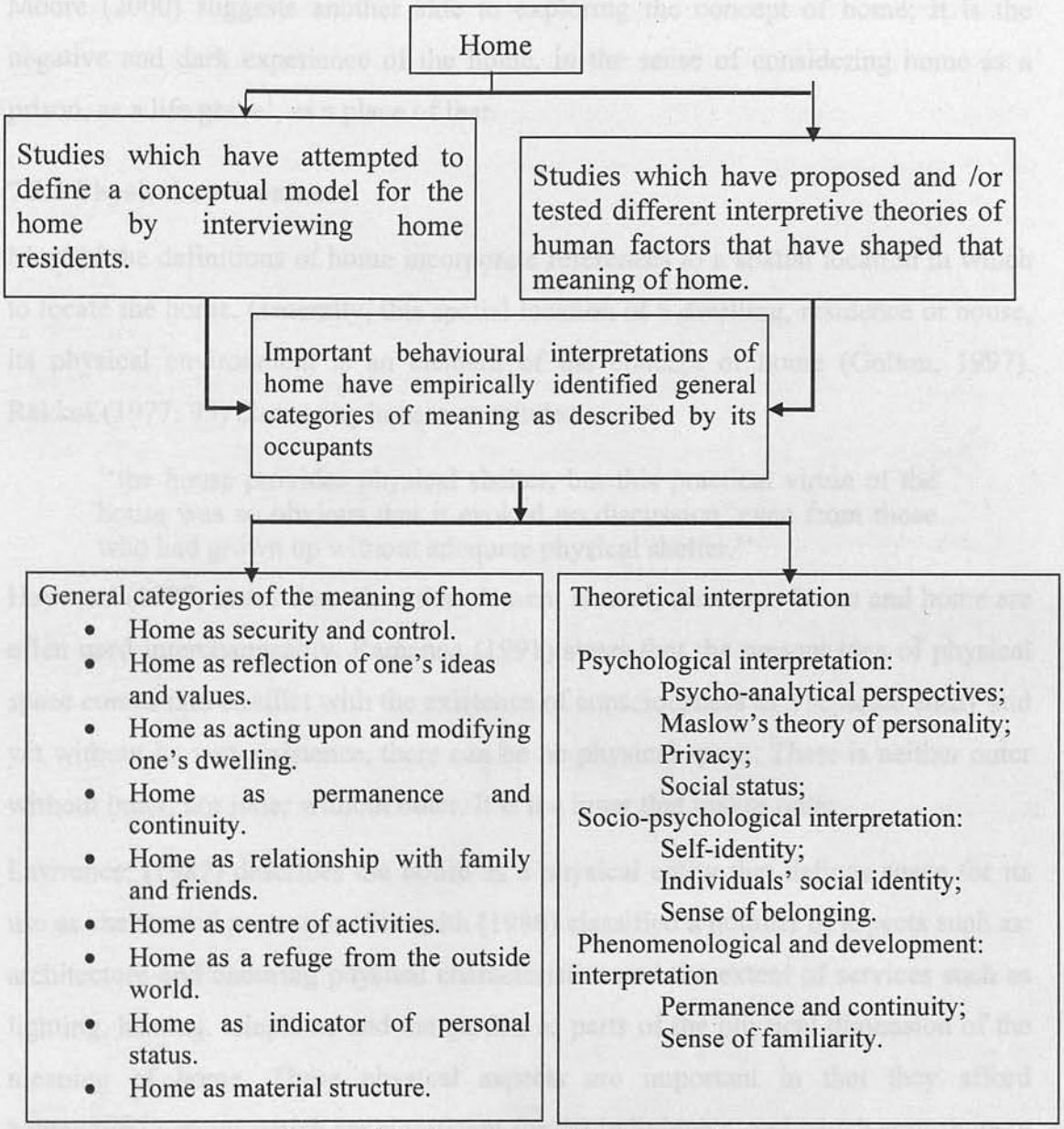


Figure 7: 1 Summary of home meaning
(based on Despress, 1996 modified by the author)

Personal	Social	Physical
Happiness	Type of relationship	Structure
Belonging	Quality of relationship	Services
Responsibility	Friends and entertainment	Architecture
Self-expression	Emotional environment	Work environment
Critical experiences	with others	Spatiality
Permanence		
Privacy		
Time		
Meaningful places		
Knowledge		
Desire to return		

Table 7: 2 Meaning of home (Source: Sixsmith, 1986: 289)

Moore (2000) suggests another side to exploring the concept of home; it is the negative and dark experience of the home, in the sense of considering home as a prison, as a life grave[1], as a place of fear.

7.2.1 Physical environment

Most of the definitions of home incorporate references to a spatial location in which to locate the home. Generally, this spatial location of a dwelling, residence or house, its physical environment is an element of the concept of home (Golton, 1997). Rakkof (1977: 93) discussing houses concludes:

> "the house provides physical shelter, but this practical virtue of the house was so obvious that it evoked no discussion, even from those who had grown up without adequate physical shelter."

Hayward (1977) states that when this element is used, the terms house and home are often used interchangeably. Ramanna (1991) states that the present idea of physical space comes into conflict with the existence of consciousness as a separate entity and yet without its very existence, there can be no physical space. There is neither outer without inner, nor inner without outer. It is the inner that makes outer.

Lawrence, (1987) describes the house as a physical entity that defines space for its use as shelter and protection. Sixsmith (1986) classified a number of aspects such as: architecture and enduring physical characteristics and the extent of services such as lighting, heating, telephone and the garden as parts of the physical dimension of the meaning of home. These physical aspects are important in that they afford behavioural options which are significant for the individuals, and which contribute to the feeling of comfort and satisfaction (Smith, 1994). Generally, affordances of the built environment could be considered as the possibility for action afforded to an observer by an object in the environment (Clark *et al*, 2002). Many researchers assume that if the basic physical comfort and security needs have been achieved, then it is possible for any house to be a home (Hayward, 1977).

Architectural space is a concretisation of existential space; existential space is a psychological concept denoting the schemata man develops while interacting with the environment in order to achieve a satisfactory lifestyle. The result of this

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[1] In the Libyan context, sometimes people describe the house as the Gaber el-denia, the grave of the life.

interaction, however, will not be a finished complete image, it will normally contain inconsistencies and parts will be missing (Norberg-Schulz 1971). Taking up the question of man's experience of his environment, space perception is a complex phenomenon, where many variables are involved which are impossible to be included in one research study.

Any element within the house could be considered as place or space. From this point of departure, home can be considered as either a place of belonging or a space. If it is a space, then Norberg-Schul (1971) identifies several levels of space:

- The geography pertains to the nations, regions and areas beyond an individual's direct experience.
- The landscape which describes the background to a man's actions and is a reflection of his interaction with the environment on a major scale.
- The urban level, which differs from the landscape in being almost entirely a built space created by human effort and purpose.
- The street level, which is used to understand the city, and finally,
- The home level, on which this research is focused.

If it is a place, then it is also a centre of action and interaction, it is a locus where people experience the meaningful events of their existence. (Norberg-Schulz, 1971).

Relph (1986) thinks the analysis of the concept of place reveals six major components:

- Firstly the idea of location is the fundamental component, as it relates to other things or places.
- Secondly, each place has its special order.
- Thirdly, the relations of place to the culture and history change as new elements are added and old elements disappeared.
- Fourthly, the meaning of place, they are characterised by the beliefs of man.
- Fifth, the uniqueness of the place, each place is interconnected by a system of spatial interaction and transfer.
- Sixth, places have meaning; is characterised by the beliefs of man, and every place is unique; they are interconnected by a system of spatial interaction and transfer.

In her article Derr (2002) stated the importance of family, social relations, and personal meaning over physical features of spaces in children's place relations

7.2.2 Attachment

One of the elements of the concept of home is as a place to which individuals have an emotional attachment. An emotional attachment to an object is the feeling of well-being when it is present and of pain when it is removed (Golton, 1997). In this case the object is the home. Many researchers identify attachment as a key element in the concept of the home (Dovey, 1987, Giuliani, 1991).

The existence of attachment has important implications. It is expected that individuals will carry out actions to maintain attachment and to prevent psychological distress caused when bonds are broken. Golton (1997) states that older residents, those with children, owner-occupiers, and those with high housing satisfaction levels often have stronger attachment bonds. Unfortunately, there is very little research into strength of attachment bonds and individuals' characteristics in terms of home (Gifford, 1987).

Generally, when discussing attachment, there is also a place for the personal investment of the individual's self identity (the element of self) in the concept of the home (Westman, 1995). This common linking of attachment and self implies that the individual invests something of themselves in the dwelling in the process of creating an attachment bond. The attachment also links to the physical structure (Giuliani, 1991). Giuliani also discusses the element of territory when considering attachment to a spatial location, arguing that attachment is necessary for a territory to exist.

The significance of physical places to the development of conceptions of the self, as in place identity was advanced by Proshansky *et al.* (1983). They note the importance of people's associations with objects and things and all spaces and places in which they are found as well as the influence of other people in those places, to shape a person's place identity.

Places in existential space can therefore be understood as centres of meaning, or focuses of interaction and purpose. The type of meaning and function defining places need not be the same for all cultural groups, nor must the centres be clearly demarcated by physical features but they must have an inside that can be experienced as something differing from outside. Relph (1986) adds that in English working-class culture, the living room or the kitchen constitute a deeply private place, and that is truly the centre of both family and individual life. And within that one room, each person may well have his or her own place, special chair or situation, which is

dissimilar from Libyan culture where they consider the kitchen is for women, their space and under their control. Home can be considered as a personal experience, for example, Shamai (1991) in her article *sense of place* has referred to it as an overarching concept which subsumes other concepts, describing the relationships between human beings and spatial settings.

When there is a commitment to an area and the household wishes to remain in that area because of family and social relationships, alteration then will be founded, this can be considered as place attachment.

7.2.3 Centrality

Hayward, (1977) found that the home was described as a base of activity by his subjects who saw the home as providing a physical centre for departure and return. Tognoli (1987) found that the quality of centrality is generally associated with the home environment.

Killy (1963)[2] suggests that individuals categorise the world in order to help understand it. In the case of centrality, they consider the home as a central reference point. The total set of categories used by each individual to understand a particular aspect of the world is their conceptualisation of it. In this sense, the home is the psychological and conceptual base of the individual.

7.2.4 Familiarity

This element includes many sub-elements such as continuity, memories and routine. This research highlights all of them under the element of familiarity. Golton (1997) assumes that the familiarity of home is a complex element due to the dimensionality included in this element. Home is experienced over time and provides a sense of continuity within an individual's life (Despres, 1991).

In her study of memories, Marcus (1992) found that continuity within the home is an important issue to occupiers. She states that occupiers would alter their current dwelling to reflect their childhood dwelling. If the person had happy memories of

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[2] George Kelly (1905-66) believed that people are scientists, in that they are continually making and testing out hypotheses about what the world is like. The unique view of the world formed by each person becomes an individual framework which is used to control their behaviour and to make sense of future experience and events.

their previous life, then this means the new the home incorporates features of the childhood dwelling, thus it maintains continuity of the idea of a home. If the occupier had unhappy memories of their childhood dwelling, alterations would be unlikely to reflect that childhood dwelling. Increasing experience of the home over time and continuity leads to increased familiarity. This provides an order to routines and actions occurring within the dwelling that, in turn, creates a predictability which is important, as it provides continuity (Dovey, 1987). Werner, *et al.* (1985:15) state that routine within the home contributes and creates a sense of rhythm which also contributes to the concept of home.

> "It is the sequential and recurrent repetition of actions and meanings and their regular involvement of people, places and processes that create a sense of rhythm, and the sense of regular rhythm that in turn gives one a sense of home"

Marcus (1992) found that residents alter their dwellings to reflect previous dwellings, particularly childhood homes. Lawrence (1987) argues the planning, altering and decorating of dwelling interiors all relate to past dwellings, although he does not provide any empirical evidence to support this theory. The author believes that the element of familiarity is more likely to be an explanation for alteration by older individuals because factors such as routine, memory and predictability become more important as one ages.

7.2.5 Primary territory

Primary territory constitutes a central and deeply significant aspect of the life of its owner, so it is reasonable to find that this element is significantly in the home environment. Studies dealing with the experience of the home support the notion of the home as a primary territory (Hayward, 1977; Seamon, 1979; and Sixsmith 1986).

Of the great numbers of definitions of territory proposed over the years, Altman (1975) identified six, issues these are: a spatial location, use of location; ownership of the location; personalisation of the location; group or individual use; and defence of the location. The hidden dimension of territory is the element of control, self-identity, attachment, and belonging.

In this context home can be viewed as a collection of territories belonging to different household members. Some of its territories are individual and controlled by one person, who asserts dominance over them, often caring, maintaining and using

them in a way that achieves privacy and a representation of themselves through the area. Typically, these areas are bedrooms. Shared territories have similar features to personal territories but with reduced individual power, use and control. As suggested by Golton (1997) public territories within the home are used by children but they are controlled and theoretically dominated by parents.

Territory also can be defined as a personalisation and marking of the environment (Altman, 1975). Golton (1997) suggests that this personalisation may be manifested in the alterations carried out by dwelling owners. The way residents personalise rooms can be interpreted as a set of customs generated by past residential experience (Lawrence, 1987).

7.2.6 Privacy

Perhaps the most common element associated with home is privacy (Hayward, 1977; Newell, 1998). Privacy is the selective control of access to the self or one's group (Altman, 1975:18), or is defined as a ''voluntary and temporary condition of separation from the public domain''. Therefore, privacy could be considered as the ability of residents to prevent or encourage social and physical interaction as they wish. Stone (1991) states that privacy in the UK developed historically in the 18th century, when a dwelling was a residence for many more people than the nuclear family and included inhabitants and servants. In addition, the dwelling was also the centre of production, welfare and education, as well as domestic activities. The result was a dwelling that was not a private retreat and it was only with industrialisation and the separation of the work and domestic spheres that the privacy element developed.

Golton (1997) states that conflict over space use and lack of privacy become particularly problematic as children become older, although this is often mitigated by children moving back to their bedrooms. Most women express low expectations of privacy within the home but strong ideas on privacy between the home and the outside world. The lack of privacy within the western home is recognised by other researchers.

> ''The privacy that everyone needs to establish any kind of independent identity in the nuclear family seems to be denied to her [the housewife]'' (Francis, 1984: 84)

This may partly be due to privacy being more important to children and elderly people than to most other adults. Golton (1997) confirms that the privacy element is more important to women than men.

Despres (1991) and Golton (1997) link the element of privacy to the notion of home as a refuge, as a place of security and control. These issues are largely determined by the age and lifestyle of family members. Many shared spaces within the dwelling become less adaptable as children grow up and increasing conflicts arise between the desire for privacy among children and between children and adults. This can result in alteration occurring to overcome this problem. Foo (1984), in her small-scale, in-depth interview research, found that dwelling alterations carried out around the birth of the first child almost always seek to improve the amount of privacy within the dwelling. Similarly, Golton (1997) expects that privacy is a particularly important explanation behind alterations to and satisfaction within households with children. These statements differ in relevance to different societies. For example, in Libyan society, the child in his/her first years also lives with the mother in the same room and the social customs relating to privacy are more focused on interactions between adult males and females. Generally then, alterations can be expected to be greater when the child grows up. The requirement to separate sons and daughters in a household is particularly related to sexual maturity, with 10 being the generally accepted age. Thereafter, when a household member marries, in such case, the household ideally offers more or less autonomous living quarters for the new couple.

In their theoretical model that relates privacy regulation to place attachment in the home Harris *et al* (1996: 91) propose that the overall ease of applying regulations in a setting depends on the effectiveness of privacy mechanisms used and on the ease of implementing these mechanisms.

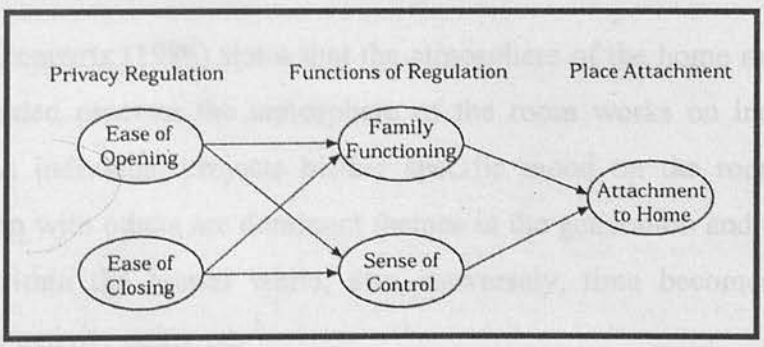

Figure 4: 1 Theoretical model relating ease of privacy regulation with family to place attachment to the home (Source: Harris *et al.*, 1996: 91)

7.2.7 Refuge

Refuge denotes a place that offers protection from danger. Essentially the home is seen as a refuge or haven from the non-domestic world (Golton, 1997; Sixsmith and Sixsmith, 1991). Despres (1991) adds that central to the idea of refuge is control, and all these elements relate to controlling access at one level or another. In other words, where privacy concerns control social and physical access, refuge concerns control all external access, and control the social and physical activities that may occur within a space. Refuge is linked also to emotional warmth and needs a positive image of the home, without the implied or explicit negative image of non-domestic work, the refuge element appears unnecessary (Golton, 1997).

7.2.8 Family

Many authors see the development of family and other interpersonal relationships as a key element to the concept of home (Roberts, 1990; Saegert (1985). The family element is associated with raising children (Hayward, 1977). Werner *et al.,* (1985) also views home as a representation of domestic life, seeing home as a place which supports the development of family and social relationships, particularly through design, furniture arrangements and decoration.

Literature suggests also that women are more likely to associate the home with family life and social interaction than men (Ahrentzen, 1992). Keeping in mind that family systems vary widely and that the range of contacts which the infant experiences is by no means standard across all cultures, the mother is everywhere normally the most important individual in the child's early life. Thereafter, the nature of the relationship established between mothers and their children is influenced by cultural norms and the regularity of their contact (Giddens, 1993).

7.2.9 The home atmosphere

In his article Pennartz (1986) states that the atmosphere of the home manifests itself as a double-sided process: the atmosphere of the room works on individuals and conversely, an individual projects his/her specific mood on the room. Time and communication with others are dominant themes in the generation and experience of atmosphere within the homes while, also conversely, time becomes meaningful because of the activity going on.

According to Pennartz (1986), it is the spatial characteristics of a dwelling which affect the experience of the atmosphere. He identifies three architectural themes:

- The arrangement of and connection between rooms;
- The size of the rooms; and
- The form of the physical enclosure of rooms.

Considering the third theme, walls may function as barriers to communication, in which case, they may also function to separate the usual household activities. This renders the house as a whole functional for those who object to certain spheres of activity being mixed. It is not the space in itself that creates, the atmosphere, but some kind of social action that takes place in the space.

7.2.10 Work

Historically, and before the second half of the twenty century, houses in much of the rural third world were considered by the families economic production units (Shihabedean, 2003). The change towards industrialisation and large-scale economic activity was equally one towards more centralised units of productivity, removing this activity from the family home. The pattern of the use of space changed also because of the separation of home and the workplace, particularly in industrialised countries.

The concept of home is in opposition to that of the workplace, and yet people still carry out paid and unpaid work at home. When they do so, they tend to restrict their work activities to 'non-home' rooms within the dwelling, such that the home can continue to function as a refuge (see earlier sub-section). Recently, there have been several articles that consider how work and home interact (e.g. Goodall, 1990; Aherntzen, 1992). These writers point out that the concept of home is more closely associated with work for women than men, because women are often responsible for the daily upkeep of the dwelling. Tipple (2002) adds that women play a major role in home transformations and self-initiated extensions in the low income settlement, a common phenomenon in third world cities.

Gurstein (1991) found that paid employment at home leads to a reduction in the element of refuge and privacy. Golton (1997) argues that an increase in the work element results in a decrease in importance of these other elements, such as refuge and privacy. Ghafur (2002) suggests that an understanding of the role of space in

home-based work requires its examination, not in isolation, but in the spatial context of overall activities.

7.2.11 Socio-cultural and self symbol

Lawrence (1987) points out that, for each individual, the design, meaning and use of home interiors are intimately related to a range of cultural, socio-demographic and psychological dimensions. Housing and the home are often seen as symbols or representations of the social or cultural system within which they develop. Despres (1991) sees the home as a political and economic entity, symbolising the domestic philosophy of the culture adding that the home is the reflection of social and cultural relations within society, among which the main factor, reflecting the cultural concept, is the role of gender. Thus, to Saegert (1985) home can be seen as a symbol of the social structure of the society and linked to status symbols.

This notion of status, which is a subset of home as a socio-cultural and self symbol, relates to a range of physical objects, furnishings and decoration (Rapoport, 1985; Lawrence, 1987). Many authors have found that alterations to the external, front façade are likely to be for status reasons, because this part of the house is the most visible and therefore, most effective at transmitting messages about the owner's status. This indicates that the symbolic element of the house refers to its contribution to the meaning of place.

In his article Gustafson (2001) introduces three main themes for the meaning of place in a triangular model self, others and the environment. In his perspective, place and the meaning of place stand forth as an ongoing process. Clare *et al.* (1996) claim that few researchers have provided a clear and theory-driven account of the relationship between place and identity and they suggest two ways in which place is related to identity: place identification and place identity. The first of these covers the way in which an individual or group, recognise themselves as fitting within a place, and is a largely personalised, internal process. The latter incorporates the character of the place itself and is largely external. These two ways trigger and condition each other mutually, in recognition that the construct of identity is complex, which calls for a more radical re-evaluation of the construct of identity.

Harbraken (1972), Rapoport (1981) and Goodchild (1991) all argue theoretically that the expression of self-identity through dwelling alterations is necessary for the dwelling to become a home. Rapoport (1981) further develops this idea by proposing

that the product of the alteration reflects the identity of the occupier, whilst the process of altering reinforces the occupier's self-identity. Furthermore, he argues that alterations carried out to reflect identity are especially important when identity is mainly supplied by the individual's occupation.

7.3. Summary

At this stage, it is useful to introduce the objectives of the set of the eleven elements of the concept of home and their connection to the current research. Starting with architecture, it is the expression of the very being of societies. In the same way, altering dwellings is the expression of owners to prove their existence. The need for privacy, personal space, aesthetics, security, social interactions, family, attachment, work, and refuge and territory are universal and such needs are expressed and mechanisms are used for their attainment and are manifested very differently in different societies.

Not every building is a dwelling, and not every dwelling is a home. Today's houses may be well planned, easy to keep, attractively cheap, open to the air, light, and sunny, but cannot be homes unless the owners introduce their own values, touch them by altering, modifying or changing those attributes which will help to demonstrate the owners or occupiers' values and needs.

The mechanism of transforming a dwelling into a home is very complex, and many major factors should be considered when dealing with such a topic. The significance of the privacy, activity centre, aesthetics, family, and security emerges from the fieldwork reported in Chapter Six of this thesis. Many alterations can be attributed to improving the performance of the owner's homes. This can be read in two ways, firstly, the failure of Libyan public housing design. Secondly, the man-environment interaction within the Libyan context. The former is discussed in many other studies (see for example Daza, 1982; Essayed, 1982; Abubaker, 1997), the latter is introduced in this study.

7.4 Taxonomy of alteration

By integrating the home concept and house alteration, one might elicit two possible roles for dwelling alterations. The former considers alteration as a process, the latter considers alteration as a result. These are explored below.

7.4.1 Alteration as a process

Despres (1991), in her literature review, sees the concept of home emerging from the process of controlling and acting on the environment. Similarly, Sixsmith and Sixsmith (1991), in their empirical study of homes among elderly people, argue that the home comes through an appropriation of space, which requires alterations and modifications to the location.

In this perspective, the nature of alteration is not important, what is important is that the alteration occurs. There is a subjective quality that arises purely from interacting with the physical factor of the home, and this reinforces the home concept for the owne. It is the process, not the result that produces the home. In this situation, dwelling alteration per se becomes a separate element of the home, in the same way as the element of privacy, or centrality or work. The process of transforming a dwelling to a home starts from the first day residents move to their new dwelling, and over time, they change, alter, modify, adapt the house and gradually it becomes a home. During the process, they transmit information about their own values and needs: economically, socially and spatially they act with other people through altering their residential space. This process of altering the dwelling includes many factors, some of which were introduced in Chapter Six, others in this chapter. The author cannot claim that all factors have been introduced nor can give which is first or which comes later, it might emerge in Maslow's theory, which will be introduced in the next chapter.

In this context, it is expected that dwelling alteration will be mentioned as important to the creation of a home which fulfils human needs and motivations. In addition, those individuals who carry out the alterations themselves are more likely to regard themselves as having a home as opposed to a house, because they are more involved in the process of creating the home. If dwelling alteration is a separate element of the home, then it is also likely that the concept of the home as a whole, as well as the other individual elements of home, are likely to be mentioned as reasons for alterations, because altering contributes to the home as a whole and not to individual elements (Golton, 1997). In this type of inquiry, focus will be more personal on the occupier which may limit the richness of the relation between the dwelling and alterations.

7.4.2 Alteration as a result.

The second approach, sees alteration as a result, such that the dwelling alteration increases or decreases the dwelling's physical support for any element, for instance, removing a wall reduces the privacy in a dwelling, which influences the match or mismatch of privacy to the physical dwelling. In turn, this influences whether the dwelling is considered a home by the occupier, Golton (1997).

In contrast to the previous view, the process of altering is unimportant, what is important is the result of the alteration and how that alteration affects the probability of the dwelling being called a home, therefore, this view emphasises the end result of the alteration process.

In this situation, the role of dwelling alterations is to improve the match between the concept of home and the dwelling itself. In this case, alterations are not separate from the concept of home, and alterations could be considered as an active adaptation of a dwelling to produce the elements of home.

7.5 The gap between designers and users

The gap between designers and users is the main reason for the failure of recent housing to fulfil the users'[3] needs. This as Abubaker (1996) suggests, is due to the nature of the relationship between the designers (the professionals) and users (house owners). He argues that the designers-users' relationship is also important in contributing to an appropriate relationship between people and their environment. To achieve a successful fit between users and buildings, one has to first understand the relationships between users and the environment, and client and professional. Following these themes, Lang (1974: 3) states:

> ''The nature of the client is changing to heterogeneity: architects no longer design for people like themselves with similar requirements, values and attitudes''.

Housing needs have shifted from those related to physiology and security towards higher user needs of self-esteem, identity and self-actualisation. According to Rapoport (1970), many of the assumed mismatches between design and occupants' needs may, in part, be attributed to a lack of conformity between designers'

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[3] User in this section mainly refer to the Libyan public house owners.

perception of the environment and that of the user group. The psychologist Canter (1970), carried out investigations oriented towards this idea and he suggests that architects and non-architects think about buildings in different ways. He records differences in priorities of building design attributes, between architectural and non-architectural students, and differences in the way in which architects and lay people evaluate houses.

In terms of differences in the perception of housing needs, the design and the use of space are of particular concern. Housing should be considered as the offering of a setting for a particular system of activities, organised in space and time. In housing, it is essential that the designers understand the relationship between people's lifestyle and the environment by asking who does what, where, when, including or excluding whom, and in what context (Abubaker, 1996).

Starting with dwellings as the anchoring point, one can then analyse other related settings. Many attempts have been made to reduce the gap between designers and users. It is not the aim of this research to focus on this but to start a dialogue about the house and its meaning and the theoretical approaches that can be used to understand both the home and the user. This is because most of what had been written about housing in Libya concentrates on the misfit of the design of new housing patterns introduced especially by the Libyan Government.

7.6 Conclusion

Home is more than a dwelling. Understanding the concept of the elements of home will help to understand the dwelling or the home in its broad meaning. This in turn will help to understand the criteria that need to be fulfilled by designers whose intention is to make homes for people rather than houses. To produce homes, architects need to:

- Understand the meaning of the home and its elements, which will help to reduce the gap between designers and the users, at the same time, it will help to understand the motivation for carrying out alterations within the dwellings, whether it a subjective factor or an objective one;
- Understand human needs and motivations;
- Carry out and adopt a post occupancy evaluation approach to investigate the built environment settings within the Libyan context; and

- Rethink dwelling by adapting different theoretical approach. This approach will be discussed in the next chapter.

Chapter Eight: Human needs

8.0 Introduction

It is usual for researchers into post occupancy evaluation to feel their research project finished when they complete the data analysis and compile the report of it. Seldom have they taken a step forward to formulate their findings within a philosophical framework. In this chapter, an attempt is made to formulate such a framework for the results and findings which were revealed in the previous two chapters. The intention is to understand the notion of home. Despite a growing literature on its meaning, the complexity of home is as yet, little understood (Sixsmith, 1986).

The decision-makers behind public housing in Libya think of housing in terms of providing a number of units of houses, a number of generic families, and at minimum cost. This attitude of mass provision is unable to consider the complexity of many interrelated elements as discussed in Chapter Seven (such as, privacy, social values, centrality, and so on) that are the basis of the home concept. Unless decision-makers and professionals consider such values, owners will need to change their dwellings to satisfy their own concept of the home. The objective of this is to rethink dwellings, to recognise them from the inside, not outside, such that the decision-maker's concept of house is brought closer to the owner's concept of home.

8.1 Residents' needs

Whatever the consistency of the aesthetic criteria developed in the international style, they were part of a theoretical framework transmitted wholesale to developing countries. An ordinary person in Tripoli, Ghat or the West Mountains in Libya would find the whole concept of modern architecture incomprehensible and would certainly find it difficult to appreciate any of its aesthetic claims and argument. Even in more developed societies, the majority of architects are incapable of reproducing the originality of the masters. They merely imitate the symbolism of the truly great modern architects, adhering to what they consider a mandatory style without definition of a set of aesthetic principles (Daza, 1982).

In Libya after independence, the images preferred by modern architects seemed to promise a sleek, technologically advanced, neat and wealthy way of life. These ideas were considered desirable by authorities, who imported foreign architects, planners and consultants to carry out their vision of modernisation. The local reality (the local environment and users' needs) was ignored (Daza, 1982) or, even more critically,

was considered as negative, backward attributes that needed to be scheduled for replacement by modernity. Two sets of human needs which are important and crucial in the issue of human habitation, physical and socio-cultural values, fell out of the equation. Public housing can be seen as the concurrent outcome of three processes: the formal representation of space by the state, the official practice that takes place in the space, and the perception of space by citizens, including their daily activities.

The spatial organisation of dwellings may be quite different in different periods, regions, cultures and societies. Societies establish an order to their living spaces and individuals reflect their characters in these spaces. The differences in the social systems of different countries thus show morphological variety in dwelling layouts. The family contains the socioeconomic structure of society. Even though it is a small element, it forms the core, which makes up the future of the society. The family needs a certain space, namely the dwelling, to achieve this function (Sungur & Çağdaş, 2004). Although many scholars identify aspects of needs differently, the fundamental theory which is widely used in this context is that which was introduced by Maslow.

In order to construct an understanding, then of the home, the following section gives an in-depth exploration of Maslow's theory of human needs, rethinking the home from the basis of human needs, which range from physiological to social and cultural values, as a way of thinking of the home from the inside, from the dimensions and values of the users. This then regards the dwelling as a totality that embraces human needs and formulates deep conjoint understanding of decision-makers, users and professionals.

8.2 Maslow's theory of human needs

The basic human needs are universal and each of them can be met and gratified in many different ways. Accordingly, these needs manifest themselves differently in different societies and different groups of people. In 1954, Maslow proposed that human beings have a set of needs that are organised into a hierarchy. These motivations are the guiding force behind a given behaviour. His argument was that if most basic needs are relatively gratified, it becomes unimportant in the mental dynamics of the individual, and then the concern of the individual shifts to less basic needs (Maslow, 1954: 80-106). The needs identified by Maslow, with the most basic put first, are:

Level 1 'Physiological needs' such as hunger, thirst, comfort and whatever helps to maintain a constant and normal blood flow. These needs can be gratified through certain activities such as eating, drinking and sleeping.

Level 2 'Safety needs' such as security and protection, from physical and psychological harm; these needs can be gratified by means such as building a shelter, controlling territory and forming a legible environment, as well as looking for a healthy environment with minimal pollution and ecological disruption.

Level 3 'Belonging and love needs' that concern the relationships among people, such as those within a group or family. These needs can be addressed by the processes of socialisation and by being given the right to own property. The idea of ownership serves to create a sense of belonging and leads to self-respect.

Level 4 'The self-esteem needs' denote one's existence being taken into consideration by oneself and by others. Such needs include a feeling of self-confidence, strength and usefulness in the world, as well as the desire for prestige, reputation and dignity.

Level 5 'Self-actualisation' needs are the needs for freedom of choice and of action. Self-determination is one example of the need for self-actualisation, since self-determination is based on the representation of interest.

Level 6 'Cognitive needs' cover the desire to know and understand. These can be addressed through opportunities for learning, exploration and self-testing.

Level 7 Finally, 'aesthetic needs', or the desire for environmental beauty come from sensory, formal and symbolic aesthetics, which serve to please the eye and inspire the spirit. In fact, space can favour conviviality or solitude, depending on the way of handling and organising its elements as well as its geometrical form and proportion.

It is recognised that meeting needs results in man's satisfaction. Similarly, and perhaps more acutely, not meeting needs causes dissatisfaction. Therefore, the more one's needs are provided for, the more satisfaction is expected; whereas, the less one's needs are met, the more dissatisfaction is caused. Meeting more needs requires fulfilling more desires. To fulfil more desires, one needs to know and realise what one's needs are. The deeper the knowledge one has about these, the greater the possibility of finding the means to fulfil them (Salamati, 2001).

Maslow suggests that the gratification of all basic needs is required to achieve satisfaction which is a low-order emotion, and gratification of cognitive and aesthetic needs results in pleasure. In terms of the built environment, however, meeting level one and two needs (physical and safety needs) is considered as a minimum requirement for the functionality of the built environment, although meeting all five basic needs is necessary to produce general satisfaction. In addition to the first five levels of needs, meeting cognitive and aesthetic needs is also required for the creation of a pleasing environment that can result in higher satisfaction, or genuine social contentment. Lang (1974: 211) states that:

> ''Abraham Maslow's hierarchy of basic needs and his distinction between basic needs and cognitive needs is the most comprehensive approach to the study of functionalism in urban design that is available to us today.''

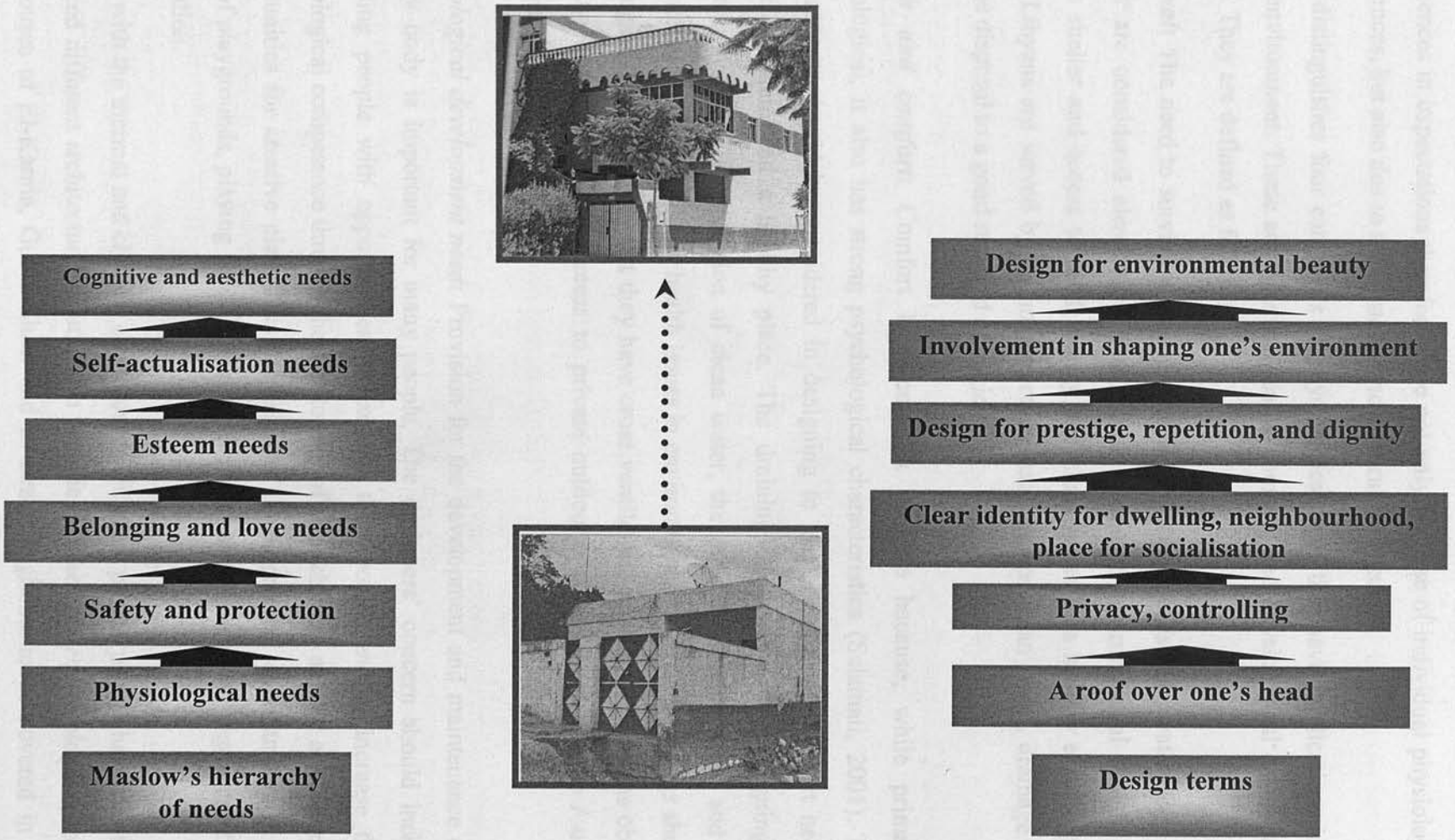
Human needs are, however, an abstract concept and must be translated into activity systems and aesthetic requirements to be made operational for urban design. It is easier to provide for basic needs in the built environment as they are relatively well-known and can be addressed by relatively straightforward, thoughtful and replicable design components.

It is more difficult to provide for cognitive and aesthetic needs as they are vary considerably among people of different cultural backgrounds and from different social strata. In fact, aesthetic values, most of the time, are personal preferences based on individuals' tastes (Salamati, 2001). A simple translation of Maslow's hierarchy of human needs in housing design terms is given in Figure 8:1. Each level of need is then separately discussed, in relation to design criteria, over the following pages.

8.2.1 Meeting physiological needs

Designing to meet the physiological needs of people seems an obvious area of concern for architects and urban designers. One of the fundamental reasons for creating buildings has always been to provide shelter from climatic conditions. Yet even this brings difficulties to the surface. People vary in their physiological needs. In any group of people there is a hierarchy of abilities. Wheelchair-bound people, for instance, or those who have difficulty walking find stairs a barrier, while others hardly notice stairs as an obstruction to their movement.

Figure 8: 1 Translation of Maslow's hierarchy of human needs into housing design terms



Differences in expectations therefore arise not only because of individual physiological differences, but also due to social status and cultural background.

Lang distinguishes four categories of physiological need that have implications in the built environment. These are survival, health, comfort, and physiological development needs. They are defined as follows:

Survival: The need to survive is the most basic of human needs. Air, water, food and shelter are considered elements of survival. In terms of environmental design, this means shelter and access to food, energy and clean water in a healthy environment. Most Libyans are served by an infrastructure that supplies clean water, drainage and sewage disposal to a good standard of hygiene.

Health and comfort: Comfort is a complex variable because, while primarily physiological, it also has strong psychological characteristics (Salamati, 2001). Two main aspects should be considered in designing to meet health and comfort needs; public sanitation and a healthy place. The draining of swamps, the designing of sewerage systems, the provision of clean water, the reduction of crowding and the provision of services are major health issues in environmental design. Dwellings should be designed in such a way that they have cross ventilation, the inhabited rooms obtain sunshine and there is easy access to private outdoor spaces for inhabitants / users (Salamati, 2001).

Physiological development need: Provision for the development and maintenance of a healthy body is important for many people. The designers' concern should include providing people with opportunities to exercise their bodies and to increase their physiological competence through the self-testing of their abilities as well as enhancing opportunities for creative play. This provision of developmental opportunities in the form of playgrounds, playing fields and sports facilities should cover all segments of the population.

Faced with the thermal and climatic conditions in different places, people have similarly produced different architectural solutions to provide the necessary physiological needs. The houses of El-Karma, Gut-el Shaal and El-Drabi neighbourhoods covered in this study were all well-served, in terms of sewerage and drainage. This allows the author to

assume that the basic physical motivation is already satisfied. Some alteration can be attributed to improving building performance in the extremes of summer daytime heat, installing air-conditioning units, adding space to the kitchen.

8.2.2 Meeting safety and security needs

People want to feel safe and secure within their built environment at the scale of dwelling, neighbourhood and city. ''A person will feel secure if he can control his own security within the limitation of reality and human potential'' (Abubaker, 1996: 77). To meet safety and security needs, it is essential to know the sources of insecurity. Salamati (2001) categorises these as physiological and psychological. Physiological insecurity is related to danger to one's physiological condition in the environment, and he divides them into harmful bacteria and pollutants, natural disasters, threatening behavioural patterns, and materials and machines.

The dwellings in the current study compared with the previous dwellings, provide a structure that it is physiologically safer than previous structural systems, as well as having better equipment. The one issue which is considered as a failing, is the unreliable refuse disposal in the neighbourhood.

Psychological insecurity can be caused through the lack of an appropriate level of privacy, attention to the issue of territoriality and attaining a sense of place and of orientation. These are discussed in greater detail over the following pages.

Privacy is an essential component in the alteration of psychological safety and security. People need to be able to carry out their activities and to have opportunities to withdraw from the people and activities surrounding them, whenever desired. In the design of housing, the concern is to facilitate the exercise of control over the flow of visual, auditory and olfactory information to and from the dwelling, building and neighbourhood. A well-functioning neighbourhood provides people with the ability to realise the existence of privacy in the urban structure, for example, by being composed of a variety of different and clearly distinctive spaces varying from public to semi-public to semi-private and private space (Salamati, 2001).

The contrary factor to privacy, in other words, that will lead to feelings of insecurity, is crowding. Crowding is to do with the perception of their being too many people around, the presence of whom makes it impossible for an individual to control his/her space.

However, crowding has to be distinguished from density, which is the product of the number of people within a certain amount of space, because crowding is based on personal feelings and social background. It differs from person to person and from society to society. Rapoport (1977: 30) argues that, while a density of 150 persons per hectare might seem too high in the USA, a figure of 350 persons per hectare might be perceived as low in Hong Kong. Privacy also differs according to social status, a person's role in society, age and gender. The desired level of privacy even varies among individual members of the family. Islamic values which are predominant in the case study area have the issue of privacy, for the family within society and the individual within the family, at their core, they have a great impact on the form and design of the built environment in Muslim societies.

In the current research, one of the major motivations behind dwelling alterations was the misapplication of such values. The plans of the houses in the case study, whilst giving consideration to the guest in including a guest room, had no semi-private space where women could socialise. The assumption was that this could take place in the living room, in which case male members would need to go elsewhere, while female guests were entertained. In many cases, the alterations undertaken tried to address this problem by adding space or adding new rooms to solve such problems. In other words, there was an underlying misunderstanding of the relationships between men and women, family members and guests.

In the traditional Muslim built environment, there is a great consideration for the role of women. In some cities, special circulation routes were nominated for them, and in some traditional cities such as Gadams, women use the roofs for circulation between dwellings. On the level of dwelling, special zones are designated for women's activities, and most of them are considered as private zones. These attitudes derive from a culture which considers the woman as at the core of the home. As Verse 21 of the Sûrah Ar-Rûm in Holy Quran states:

> "And among His signs is this, that He created for you wives from among yourselves, that you may find repose in them, and He has put between you affection and mercy. Verily, in that are indeed signs for a people who reflect. "

There is a strong metaphor between the home and women in the Sûrah an-Nahl, Verse 80:

"And Allah has made for you in your homes an abode"

This cultural connection between the home and woman even exists in the language, where the terms give specific words (Sakina, mercy, repose, abode).

Deep rooted cultural and religious attitudes led Libyan families to deal with women's needs in dwelling design with some attention and to designate zones were she can fulfil her role without disturbance and in complete freedom. Even greater care was put into maintaining privacy for female guests that they should feel complete comfort when they visit their friends. In the current study, many alterations involved adding new spaces to the living room to avoid any disturbance for the female guest. In some cases, a new entrance was added to allow females and their guests to enjoy their own circulation routes.

Two main types of space for men in the traditional Libyan dwelling are the private space which includes the master bedroom and the guest room. According to Libyan norms, nobody is allowed to enter the first unless he/she has permission. The second type of space is the social space which is the guest room where male family members can meet friends, relatives and guests without disturbing the rest of the family.

8.2.3 Meeting belonging and love needs

According to Lang (1974: 252) based on Maslow, once survival needs have been reasonably met, people most keenly feel the need for membership in a group. The group provides individuals or other groups with love, support and identity. Thus, the mechanism that underlies the feeling of belonging to a place is not purely a matter of design. Many argue that people are increasingly becoming individuals with less authentic social bonds and that this social trend is independent of the nature of the built environment. It is commonly agreed also that belonging does not necessarily take place in a predefined spatial setting. Lang (1974: 252) argues that the goal of the neighbourhood designer at this level is to enhance people's abilities to fulfil their needs for affiliation to the extent that it is possible.

People in Libyan societies are culturally disposed to meet belonging and love needs in two fields: their interaction with neighbours and wider social activities.

There is an aphorism in Libyan culture that if somebody lives with people for 40 days, he becomes one of them. The reflection of this notion on the level of the dwelling is that some space in the dwelling is considered as not just for the family itself but for neighbours and guests. This is usually the guest room and the spaces set aside for family members to socialise with friends of the same sex. In major unforeseen events or at rites of passage through life and social celebrations, such as circumcision or marriage and funeral gatherings, the dwelling is open to visitors. Neighbours can use it without rejection from the owner.

Hospitality: To belong to, and be part of, wider society beyond the neighbourhood is also important. It is customary for a Libyan host to say ''the house is yours'' which reflects the hospitality and warmth to the guest. This necessity to be welcoming then incurs problems of how to have a house that is social and open, yet protects the family, as discussed in the previous sub-section.

Libyan families deal with each other with values and norms which reflect their willingness to support their neighbours, especially with social events. When a family faces such an event and needs help in preparing food, they require as large a kitchen as possible to allow women to share in the preparation. In the case of the dwellings of the case study, the kitchen space was too small for this function, and in some instances, this function was relegated.

To feel that one is part of a broader society, one has to know what is going on in it. Therefore, people need to be provided with many opportunities to meet each other and able to participate in the lives of others. This does not mean that the privacy of individuals should be undermined. The sense of security achieved by a safe and secure environment and provision for desired privacy is a prerequisite for the development of a sense of community of belonging.

8.2.4 Meeting esteem needs

Generally, human beings have a need for self-esteem. Lang (1974) categorises this need into the need to hold oneself in high esteem and the need to be respected by others. The first can be achieved by having control over one's life and through the possessions one has. The second is perceived through external rewards, status and the reliance of others on oneself.

Applying such notions to the current research, one can state that the motivations for altering the front façade and modifying the boundary wall are a process of transmitting messages to others about oneself. In addition, offering hospitality to others, particularly in social events, is another means of seeking respect from others.

Perhaps a clear way to think about the relation of self and home is to consider the home as a symbol of self and self-identity. Cooper (1974) elaborates this idea.

In perceiving home as the symbol of self, man sees its interior as self, viewed from within; it is his own created and changing symbol, reflecting the essence of self as vied by self. And he sees the exterior as the symbol of self which he wishes to present to the outside world, or self as viewed by others, it is almost as if the home-self continuum could be thought of as both the negative and positive of film. There are strong indications that a dwelling offers a person a rare chance to create expressions of himself. By alterations, these expressions transfer the house to a home.

8.2.5 Meeting self-actualisation needs

What humans can be, they should be. Musicians must make music, artists must paint, and poets must write if they are to be ultimately at peace with themselves (Abubaker, 1996). The need for self-actualisation as defined by Maslow means to become what one can become. This need we call self-actualisation, namely, the tendency for individuals to become actualised in what they are potentially.

Because the self is simply an idea, an intangible thought pattern, there exists a powerful desire to manifest it, make it into a concrete imprint on the world. It is the desire to leave a trace and this should be, in some way, a consequence of the unique self. To actualise is to make actual (i.e. physical) something which, it follows, is not actual to start with. Therefore self-actualisation is not the same as fulfilment (Adass, 2001).

According to Lang (1974: 300), self-actualised people have the ability to turn provoking situations to their own advantage, therefore, they are usually able and content to make themselves at home in almost any place. They respect democracy and also tend to be more concerned with the well being of others. Because of their idealist nature, self-actualised people involve themselves more with the problems of others and in the process of decision making, seek to contribute to the improving of the community.

The common feature of the need of self-actualisation is that its emergence usually rests upon some prior satisfaction of the physiological, safety, love and belonging, as well as esteem needs. This also true if a person participates in designing his own house: only when the house is sturdy and weather-tight will he experience the sense of pride that marks the attainment of self-actualisation (Adass, 2001).

Although physically at a lesser scale than the construction of an entire house, the alterations of a given building into a 'home' is an equal feat in phenomenological and psychological terms. It introduces into the physical world a new thing that existed previously only in the worldview and the intentions of the doer and in doing so, can be categorised as the actualisation of the owner's self. As introduced in Chapter Six, in the concept of the ideal home, the analysis showed that by comparing the given house, the altered house and the ideal home, what emerged through the questionnaire responses which indicated a trend from the given to becoming, through the process of alteration (Figure 8:2).

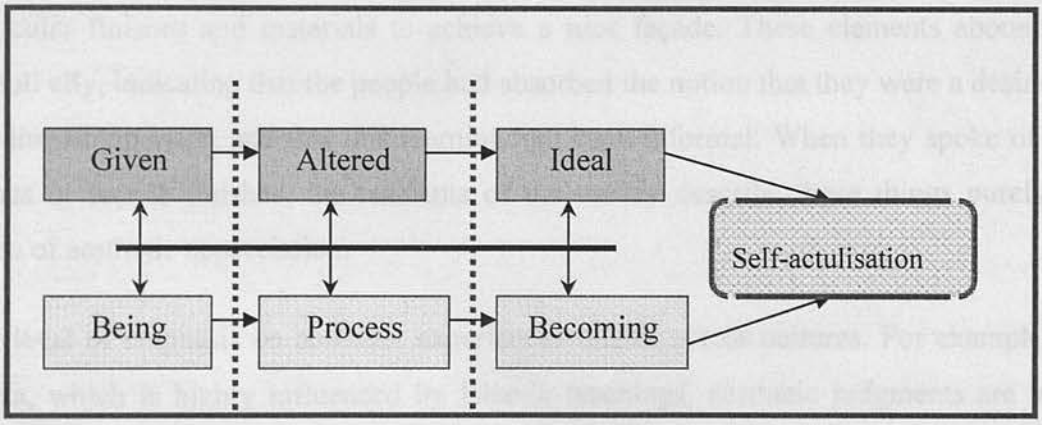


Figure 8: 2 Alteration and self-actualisation (Source: the author)

The examples of self-actualisation cited above from Abubaker (1996), of music, poetry and painting, suggest that self-actualisation is highly individual and highly specialised and will lead to observably unique outcomes for each different individual. In the context of the home, on the surface, it seems that alterations are directed by cultural behaviour, even though displaying different elements could be attributed to the individual self (please refer to the arches form in Figure 8.3).

8.2.6 Meeting cognitive and aesthetic needs

The process of learning may occur consciously or subconsciously and in formal, semifo-

rmal or informal places. Formal learning happens in formal institutions such as schools and universities under the direct instruction of teachers. Semiformal learning takes place in places that are built for educational purposes but do not offer direct instruction, for example, those institutions such as libraries and museums that provide resources for education as well as entertainment. Informal learning may take place anywhere by looking at the actions of others or paying attention to the surrounding environment (Salamati, 2001).

Cognitive needs, as Maslow described them, are the need to know and understand, and to apply that understanding to all stages of the human life cycle, rather, than as has been argued, that ''they are perhaps most critical for children of between the ages of five and twelve'' (Lang, 1974: 304).

Aside from students, professionals and others who are directly interested in architecture, learning from the built environment tends to be informal. In the case of the recent study, for example, many people copied the arches which they saw to be beautiful, or used particular finishes and materials to achieve a nice façade. These elements abound in Tripoli city, indicating that the people had absorbed the notion that they were a desirable building component, and that this learning had been informal. When they spoke of the arches or façade finishes, the residents of the survey describe these things purely in terms of aesthetic appreciation.

The level of emphasis on aesthetic experiences differs across cultures. For example, in Libya, which is highly influenced by Islamic teachings, aesthetic judgments are very different from those in western culture. They also vary among the residents of a community due to many reasons such as wealth or education. Therefore, designers should allow residents to add their touches to their property that reflect their aesthetic needs. In the current survey, it was obvious that those owners who altered their dwellings produced beautiful façades which they appreciated more than the original ones (see Figure 8:3)

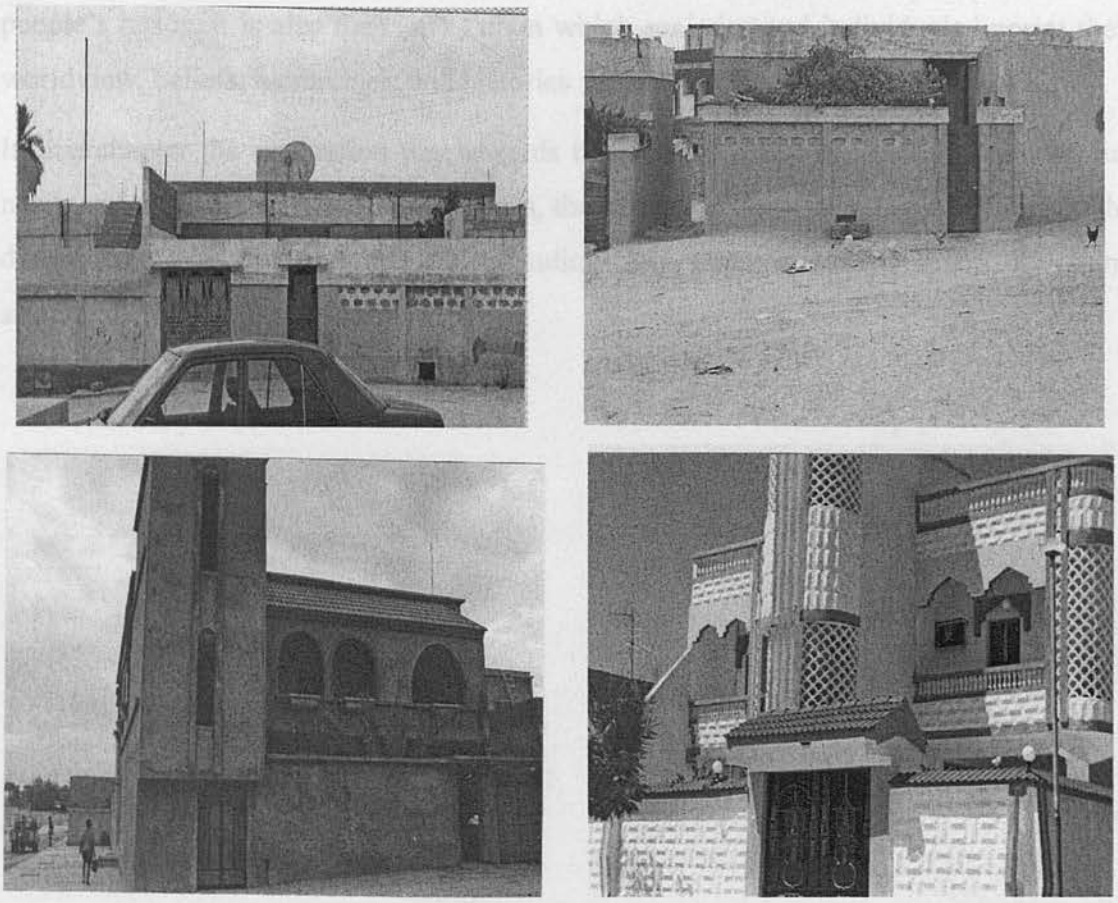


Figure 8:3 Differences between dwellings aesthetics before and after alterations

(Source: the author)

According to Maslow's model, cognitive and aesthetic needs (along with self-actualisation needs) are the higher and more important ones, because they are very highly sophisticated, and it seems impossible to satisfy all users with the same aesthetics, therefore the job of architect is a matter of producing that state of balance between these desires.

8.3. Conclusion

Maslow's hierarchy of human needs is modelled on a trend that is initially entirely physical, quantifiable and objective (the need to eat, for example, is independent of character), and rises to entirely subjective, qualitative dimensions, at each stage the impact of architecture becomes less and less direct, it does not, however, disappear completely, because the built environment is not just the provision of roofs over

people's heads, it is also the canvas upon which societies and individuals imprint their worldview, beliefs, hierarchies, and histories. In other words, their culture and identity.

In this chapter the orientation was towards the person, the owner as a person who has needs and motivations. In the next section, the author will deal with the dwelling and the dimensions and the way of understanding this complex phenomenon by using structuralism theory.

Chapter Nine:
Home as structure

9.0 Introduction

Home is more than a dwelling. Its role in everyday life is integrated with the rich social, cultural and historical significance that determines lifestyle and identity. The concept of home is a complex of overlapping and interrelated elements, synthesising a network of social, customary, conscious, and subconscious drives into a whole. In other words, POE is the observation of a holistic phenomenon that brings together a huge range of academic disciplines and theories. Although spatial analysis, questionnaire analysis and comparison with historical housing pattern are effective at identifying components of the phenomenon of alterations, the author argues that these are not enough to explain it. A philosophical overview is needed, within which the various analytical approach find their location.

The objective of this chapter is to introduce the concept of home as a structure which can be used to understand the home, to go deeper in its broad meaning of which designers need to be aware if they intend to produce homes more integrated to residents and their needs. Among the theoretical approach, structuralism offers not a doctrine but a method to explain and seek laws that guide almost any phenomenon.

This chapter discuss the building as a structure in general, then discus the concept within the Libyan culture.

9.1 Structuralism

Structuralism is a tool for thought that stemmed from the need to break away from a 'classical' scientific understanding of the world as a matrix of quantities, causes and effects, to one of the processes and phenomena of non-physical meaning. It emerged as a general philosophy introduced in 1929 in the social sciences (linguistics, ethnology and psychology). In the 1960s it reached its peak with the work of Levi-Strauss, who extended the analogy of structure to society.

Many definitions can be given for structuralism, depending on the standpoint of the researcher, whether this be in architecture, anthropology or psychology. Culler (1973) states that structuralism is neither a theory nor a method but a way of looking at things. Piaget (1971) considered it as a method of inquiry based on the concept of totality, self-regulation, and transformation. In the general sense, structuralism attempts to discover systems of order existing within reality. Its fundamental aim is

the identification of general laws, by either inductive or deductive processes (Hamidi, 2003).

Structuralism raises a number of notions related to the parameter of time. This indicates that any phenomenon would be understood better through diachronic analysis. This can be done by studying all objective and subjective aspects, corresponding to holism, In other words, the idea of holism in structuralism was developed to explain that wholeness in a given system is the transformation of knowledge through time. A system that exhibits wholeness can be said to 'contain' its own laws of composition, self-regulation and even purpose, and this earns it the title of a structure Hence, the concept of structure basically depends on its process of transformation and the transformational process itself is a key concept in understanding the whole and how it works. These notions and their relationships with the house are discussed in this section.

The core idea of structuralism is structure and its properties. It is probably best to approach the term structuralism through an attempt to understand the concept of 'structure' within this theoretical point of view. Without an understanding of this fundamental concept, it is difficult to arrive at an understanding of the intellectual movement referred to as structuralism.

Structure is an abstract set of formal relations underlying the greater manifest richness of observable forms. It is not an aggregation of elements, but an expression describing a set of relations between things governed by some overriding formative law (Hamidi, 2003). The structure could thus be defined as a system of relationships (Boundon, 1971). These relationships are stable and characterise the structure. The system of relations is thus perceived as the basis of the structure. Boundon adds that a process can be called structurally stable, since the structural parameters are constant at all the times considered.

Boundon (1971) indicates that structural analysis is, in a way, a theory of appearance, since the structural description allows for a reconstruction of the phenomenal characteristics of the given system. Structural analysis finally demonstrates the coherence of facts while requiring that all elements of the structure are taken into account. By definition, it covers the whole set of apparent characteristics of a system.

The concept of structure can thus be extended to the analysis of process. Boundon

argues that the structural description of an object does contrast with its phenomenal description, as essence does with appearance. Structural analysis thus can show as coherent facts that otherwise appear as incoherent. Lastly, structural analysis always emphasises that the parts of an object are dependent upon the whole, which is the object.

For a more formal definition: a structure is any conceptual system that has the following three properties:

- Wholeness: This means that the system functions as a whole, not just as a collection of independent parts;
- Transformation: This means that the system is not static, but capable of change. New units can enter the system, but when they do they are governed by the rules of the system; and
- Self-Regulation: This is related to the idea of transformation. You can add elements to the system, but you cann't change the basic structure of the system no matter what you add to it. The transformations of a system never lead to anything outside the system.

These three properties will be discussed later.

Many attempts have been made to connect structuralism to architecture (Luchinger, 1981, Hillier 1984). For example, Luchinger (1981), in his interpretation of structuralism in urban and architectural fields, mostly refers to surface structure. He believes that, by nature, structuralism is concerned with the configuration of conditioned and polyvalent spatial, communicational, constructional or other units of form at all urban scales. In his discussions of the articulation of built form, or anti-amorphism, he claims that the structuring of a building volume is one of the fundamental principles of structuralism. His approach therefore concerns two things:

- The articulation of the building block into smaller units that are humanly comprehensible (anti-block movement); and
- The articulation of the urban building fabric (Luchinger, 1981).

In this interpretation, Le Corbusier's 1935, Maison Jaoul in Paris can be called the first structuralist work of architecture. It consists of a number of individual building units and was inspired by North African desert settlements. In this project and others Le Corbusier highlighted the two main principles of growth and extension, Kahn in

the main façade of the Morton Weiss house developed another idea that was relevant to structuralism, which is the façade that could be altered by the user (Luchinger, 1981).

The Otterlo meeting (1952) can be regarded as the beginning of structuralism in architecture and urban planning. According to Luchinger (1981), it marked the most important Avant-Garde post 1960 movement, in reaction to the functionalism of ClAM[1] (1920-1960) and offered a comprehensive ideology that hugely influenced urban planning. Structuralism's entry to urban theory also sought to address the more pragmatic catalysts of civil disorder and public nervousness (Huevel, 1992).

El-Feki, (2003) states that structuralism as an idea contributes to explaining the evolution of a phenomenon. Structure has a code and laws of composition for reproducing the phenomenon.

8.1.1 Structure and system

Central to structuralism is the concept of system, a term that describes the essential relatedness of all things. Luchinger, (1981: 326) explains a structure as. "A complete set of relationships, in which the elements can change but in such a way that these remain dependent on the whole and retain their meaning. Ujam (1997) cited in El-Feki, (2003: 39) supports the general definition that a structure is a system of transformation, by explaining that a structure consists of the same components and relationship as the system, the only addition is time (or process). The relationships between the elements are of as much importance as the elements themselves. The elements are therefore interchangeable, but the relationships are not. Hillier & Leaman (1972) indicate that all structure should be explained referring to their history as they are transmitted together through the changing systems of their units and regulated by the laws embedded in the inherent relationships.

Studying the relationship between the concept of structuralism on one side and the instrumental and the social systems on the other, one can find that the use of a structuralist approach is not suitable in instrumental systems of planning because they are not living organisms and changes in them are as a result of decision-making, not systematic evolution. The concept of structuralism is better used to enhance an understanding of social systems (El-Feki, 2003) bearing in mind that the structure of

[1] CIAM Congrès Internationaux d'Architecture Moderne.

society depends on its elements and on three levels of interaction:

- The relationship between an element and itself;
- The relationship between an element and other elements;
- The relationship between an element and nature. The above levels of interaction indicate that, if any of the structural elements did not have any relationship with the other members, it would have no identity within nor contribute to the structure. In other words, if there was no communication, transformation would not take place or would not be controlled and checked Islami, (1998).

Systems can fall into categories, closed and open systems. In closed systems, nothing passes either inwards or outwards. In open systems, influences enter the system from outside, are processed and transformation occurs to the system and beyond. (Hamidi, 2003). The open system maintains itself in a continuous inflow and outflow of information. Based on the dynamic interaction of its components. Even within one particular system there are may be subsystems or associated systems of different types, like natural systems, systems of human activities or social systems. This dynamic interaction of parts makes the behaviour of parts different, whether in isolation from or within the whole (Bertalanffy, 1968). In the current study, both the dwelling and the occupier could be considered as open systems, the most visible inflow on the dwelling is the alterations carried out on it.

9.1.2 Deep structure and surface structure

Structuralism explains a set of phenomena by showing how they could be generated by the operation on the surface of transformation rules that pertain to an underlying structure. A surface structure thus is the transformation of a deep structure and vice versa. Deep structure is fully equivalent to the normal meaning of the term structure and its rules of transformation generate the surface structure. The deep structure concept is equally a theory to be related deductively to observable phenomenon in normal scientific fashion. Formal models for the general relationship of structure to transformation rule to observable form, can be found in various branches of mathematics and logic (Hamidi, 2003). Structuralism proposes that the deep structure abstract formation is the basis of richness and variety and its applications are returned to the surface level (Hillier & Hanson, 1984).

Assiter (1984) argues that the structure is the 'real things' which lie behind the

appearance. Hence one cannot discover the identifying criteria and essential components in a straight forward method by just looking at the surface appearance of the physical objects instantiating them. To the author, the surface structure is telling the story, on the other hand, deep structure is explaining the story.

According to Eiseman (1994), in terms of the built environment, the surface level is about the sensible aspect of architecture and the deep level is about the syntactic aspect. Deep structures concern the underlying relations, and provide an abstract conceptual framework for the formal regularities. He refers to Chomsky's idea of the deep structure of architecture as a model for outlining the processes derived from a series of abstract formal regulations, a non-physical level at which formal relationships interact. The notion of deep structure allows for more holistic analysis of the interaction of the surface and deep structural levels (Eiseman,1994).

Hillier (1996) uses the analogy of the grid to discuss some of the physical surface characteristics of the structure and their relationship to deep structure. A grid is way in which integration is arranged in a pattern of some kind, which supports functionality and intelligibility to varying degrees, in order to create a system of differentiation. It is this differentiation that is called structure in the system. He also comments that the physical character is a fundamental characteristic of the configuration and that the addition or subtraction of an element could cause properties of the whole configuration to change. On the other hand, there is some degree of local determinacy from configuration to its structure. He mentions the importance of physical aspects by saying that to believe that structuralism may reveal the hidden aspect of things, or even to wonder whether structures describe the essence or the deep meaning of things, prevents one from understanding the concept of structure.

Abu-Lughod (cited in El-hatloul, 1996) in her study of the Muslim city, stress the fact that there appear to be a certain basic deep structure to the Islamic expression in space and she suggests that some mechanism common throughout the lands of Islam, helped to generate the deep structure and more idiomatic expressions of these shared deep structure. She stated that these expressions are the legal systems of the built environment in the Arabic Muslim city.

In the context of Libyan housing, a surface structure for the concept of privacy would be all the arrangement, behaviours, activities, layout that will actually meet privacy. The deep structure is the desire to 'exclude the women', bearing in mind that privacy

in other countries varies from one culture to another.

9.1.3 Buildings as a structure

Markus defines a building as:

> ''an organised system or organism; that is, having a complete set of interrelated parts and sub-systems, controls, feedback devices, means for energy storage and generation, and the dynamic response to change such that desirable homeostasis (as in the body) can be attained''.

This definition specifies parts which are integrated to a whole, but it also points to the capability of the building as a system to respond to external influences, i.e. it points out that at least one of the functions of the building is to modify the existing (external) environment. Markus also refers to the context of which the building is a part when he concludes that ''the design of a...building cannot be achieved without an understanding of the adjacent systems- the climate or human response system''.

These notions can be applied to the dwelling as follows:

- It consists of elements integrated into a whole.
- The basis of this integration is an order. The parts need not relate to each other except with reference to the whole; and
- The dwelling is part of a context and is therefore influenced by other structures, by the external environment and users. The dwelling, influence equally imposes on its other structures in its context. (Markus *et al,* 1980)

Structuralists are interested in the interrelationship between structures, also called ''surface phenomena'' and laws, which are the ways that units can be put together. Structuralists believe that the underlying structures which organize units and rules into meaningful systems are generated by the human mind itself, and not by sense perception. As such, the mind is itself a structuring mechanism which looks through units and files them according to rules. This is important, because it means that, for structuralists, the order that we perceive in the world is not inherent in the world, but is a product of our minds. It is not that there is no ''reality out there'' beyond human perception, but rather that there is too much 'reality' (too many units of too many kinds) to be perceived coherently without some kind of grammar or system to organise and limit them.

Markus *et al* (1980) identify two main sub-structures that could be observed in a building: active sub-structures and passive sub-structures. The former includes the human being (as in the family, a man, woman, child or visitors), the later includes

mechanical, building components, construction materials, space etc (see Figure 9.5).

The building is response to changing external conditions is achieved not by the structure as a whole or by all parts of the structure but to different degrees, by specific sub-structures and their parts which are designed and developed for this purpose. Other sub-structures remain passive. This distinction can be used to identify another two types of sub-structures in a building: mechanisms designed to function, react to or produce internal conditions (they can be called mechanistic sub-structures), and those not actively reacting or functional, though they are essential for the existence of the structure as a whole (they can be called static sub-structures) (Fery, 1989).

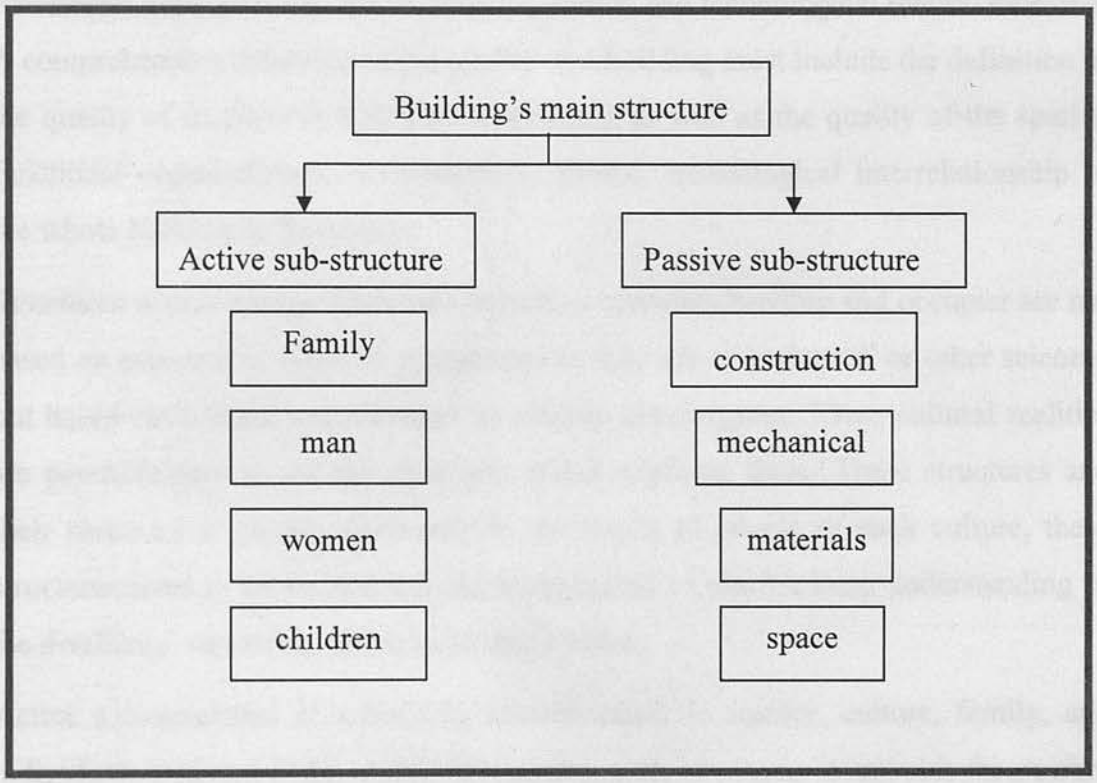


Figure 9:1 Dwelling's main structure

Static sub-structures of a building, while they do not actively do something, nevertheless react passively upon external influences, such as climate and use; they expand and contract under changing temperatures and may be used as a thermal reservoir such as, for instance, the wall and roof construction of a building and they deteriorate over the course of time, leading to their structural obsolescence and again giving rise to repair and maintenance work (Fery, 1989).

Mechanistic sub-structures of a building are pre-programmed to function according to their purpose. They require a constant intake of energy and other resources when

they are in operation and deteriorate under working stress, leading to obsolescence and initiating repair and maintenance or replacement (Fery, 1989).

Another classification can be used to understand a building as a structure was stated by Broadbent (1980:366) who suggests that the parts... are real holistic units, such as, the division of the building into corridors, rooms, windows and doors. The study of such parts will be at the same time a study of the characteristic of the whole. As a result, enormous structures were included in the building, and their classifications will vary depending on the orientation of the research and the researcher. Within all these identifications, the quality of a building cannot, therefore, only be the sum of the quality of its parts, and it cannot only be the quality of its parts in their spatial, functional, organisational, environmental, formal and technological interrelationship. A comprehensive definition of the quality of a building must include the definition of the quality of its parts in their interrelationship as well as the quality of the spatial, functional organisational, environmental, formal, technological interrelationship of the whole building to its context.

Structures which emerge from the interaction between dwelling and occupier are not based on concrete or physical phenomena as they are in biological or other sciences but based on cultural realities such as kinship organization. These cultural realities are psychological as are the structures which explicate them. These structures and their structuralist models exist only in the minds of people of each culture, these structures need to be understood and investigated to reach a deep understanding of the dwellings' structures rooted in people's mind.

Active sub-structures in a building context relate to society, culture, family, and individuals (man, woman, child). Discussing such structures is outwith the current research bound, however, some of these sub-structures will be highlighted.

Building as a system may include many structures and sub-structures which in turn includes many elements. Main structures are: spatial, physical, social, visual and psychological.

In Table 9:1 which indicates four sub-structures related to the spatial main structure. Each element of these structures can be a sub-structure, which, within special circumstances, raises many surface structures, this depends on the interaction between the user and the space in certain social activities. For example, In Libya in special circumstances (marriage celebration especially in summer) the dwelling can

be expanded even to the street by fixing new boundaries to indicate that the new space (which is the street) is for private use. This indicates that time and the event also forces affect the sense of belonging and control in terms of housing design.

Main structure	Sub-structures	Elements
Spatial	Space form	Plan form, floor form, size, height ceiling form, wall form
	Space locations	Physical similarities Functional Social purpose
	Adaptability of space	Change of layout, change of service, expansion

Table 9:1Spatial structure

Table 9:2 shows the physical environmental structure which can include three main sub-structures. The transformation of these depends mainly on the standards that are applied by the designers. Most of theses sub-structures could be classified as static structures, which means they could be controlled and the interaction with the user is more clear within the built environment context.

Main structure	Sub-structures	Elements
Environment structure	Optical quality	Natural light, view, Blackout
	Climatic	Temperature control Ventilation, humidity control Cleanliness of air
	Acoustics	Sound quality Sound insulation
	Services	Liquids, drainpipe, gasses power, lighting, communication

Table 9:2 Physical environment structure

Table 9:3 categorises the social structures into two main sub-structures. The first one, relates to the user which includes many elements. The user could be a man, a woman, chilled or an elderly man or handicapped person. The second structure is the group of people and their interaction within the space.

The major structures of environmental conditions generated by a dwelling have earlier been classified as spatial-organisational, physical, social and visual-formal.

Main structure	Sub- structures	Elements
Social structure	Individual	Security Privacy
	Group	Group identification Interaction Group privacy

Table 9:3 Social structures

Accordingly, each individual structure in a building has spatial-organisational, physical, social and visual-formal implications. A wall panel, for instance, helps to generate space thus contributing to the spatial organisation of a building. It also affects the physical condition of the spaces on either side by influencing, for example, acoustic and lighting conditions. At the social level, it generates together with other elements, a social environment to which the user responds and, with its form, colour and textural quality, it influences those of the visual-formal spaces of which it is part.

Main structure	Sub-structures	Elements
Visual-formal structures	Building volume	Surface texture
	Compatibility with environment	Dimension, scale Volume to site relationship Relationship to landscape
	Internal space	Form, proportion Sequence surface texture Lighting circulation
	Interaction internal-external space	Interaction, privacy

Table 9:4 Visual-formal structures

From the psychological point of view, buildings hide many structures, keeping in mind that these structures divers from one person to other and from one type of building to the other, in the context of home, the field of this research privacy, personalisation, territory, are the most common structures that can be seen.

9.1.4 Home's structures

With our homes actions and perception, which confirm, establish, question, modify, enrich, transform, which in other way affect our sense of identity. As a result, the very diversity of these notions of home suggest that home is a complex, multifarious phenomena.

The next few pages present a structuralist interpretation of some of the owners' responses to the two main questionnaire sections (ideal home and alterations). The data obtained from the piling process is reorganised in Table 9:5 and 9:6 into classified into three columns. The first indicates the surface structure, the second reports on the frequencies for each structure and the third column indicates the deep structure. The intention is to highlight the dimensions shared by owners, bearing in mind that the dimensions are assumed to be the motivating forces behind the occurrence of alterations.

In Table 9:5 and table 9:6 many dimensions are associated with alteration such as: men's space, social activity, privacy, women's space, function, culture, life-style, aesthetics, future extension, security and work are deep structures that emerged from the respondents' answers about the ideal home and reasons for altering their dwellings.

As mentioned in Chapter Seven, many hidden meanings associated with the home. Sixsmith categorised them in three main structures personal, social and physical. (please return to Table 7:2)

surface structure	Freq.	Deep structure
Two storey building	40	function, social
Large kitchen	40	function
Arches in front façade	35	Social. personal
Large guest room for men	30	Social. personal
Two entrances for the dwelling	28	Social, personal
Women's guest room	25	Social, cultural
Dwelling surrounded by yards (villa)	25	Social life of the family
Guest room separated from the dwelling	20	Social, personal, utility
Dining room	12	personal
Office	8	personal

Table 9:5 Ideal home's surface and deep structure

By concentrating on the information, it is possible to go into more detail and classify it into hidden meaning and forces beyond the physical alterations that have been made. Two main concepts should be kept in mind: alteration on the first level does not happen in isolation from the interactions of people with their dwellings, and this includes many hidden forces which affect and are affected by the dwelling design. On a large level, society is always changing and the dwelling will not become a home unless it reflects the social, functional, psychological, and economic motivations of residents.

Surface structure	Freq	Deep structure
Modifying main entrance	29	Personal , social (security, privacy)
Adding space to guest room	26	Social, utility, Personal.
Adding space to living room	26	Social, utility
Adding rooms on the roof	20	Social and utility
Adding new floor	9	Social, utility (family support)
Adding shop	6	Personal (family support)
Adding new entrance	3	Social (privacy)

Table 9:6 Alterations' surface and deep structure

To simplify data, into more simple output, three main deep structures could be identified from the current research, theses are: utility, Personalisation and Cultural values as shown in Table 9:7. Bearing in mind that:

- There are no clear boundaries between these deep structures.
- Social deep structure for example, includes many levels such as society level, tribe, community and family level. These levels have an affect on the home within deep structures embedded in each person which in turn varies from one to other.
- These levels integrated into a whole and should be dealt with in a whole.

utility	Personalisation	Cultural values
Structure Spatial Material	Happiness Self-expression Privacy, security Sense of belonging. Refuge Atmosphere	Society Religion Relationship Family Community

Table 9:7 Main home's deep structures. (Source: Sixsmith, modified by the author)

Utility, for example, is well known in architecture since Vitruvius as he acknowledged that utility in this context refers to the use of the building and its proper functioning, (cited in Taylor *et al*, 1994). It seems that it is not enough for a dwelling to be a home if it only meets the basic functions, considerations of the residents. Unless the three structures are implanted between the dwelling and the residents, the dwelling will not become a home.

Personalisation, as discussed in Chapter Two, incorporates many explanations privacy, status, identity and self expression, which is one of the major deep structure and acts as a push factor for carrying out alterations.

Understanding deep structures and their explanation cannot be done easily. In the current research, to grasp the deep structure for each need mentioned in the section about the ideal home or the reasons reported by subjects as push factors to carry out alterations, the author could not cover all that but he attempts to explain some of them in a structuralist way.

As stated in the previous chapter, the interaction between the dwelling and its residents results in alteration, these alterations took place at a certain time, according to certain needs, and has been carried out according to a need deeply inherited by the owners and their families (deep structures) for example, an explanation of a need to have a larger guest room could be as shown in Figure 9:2.

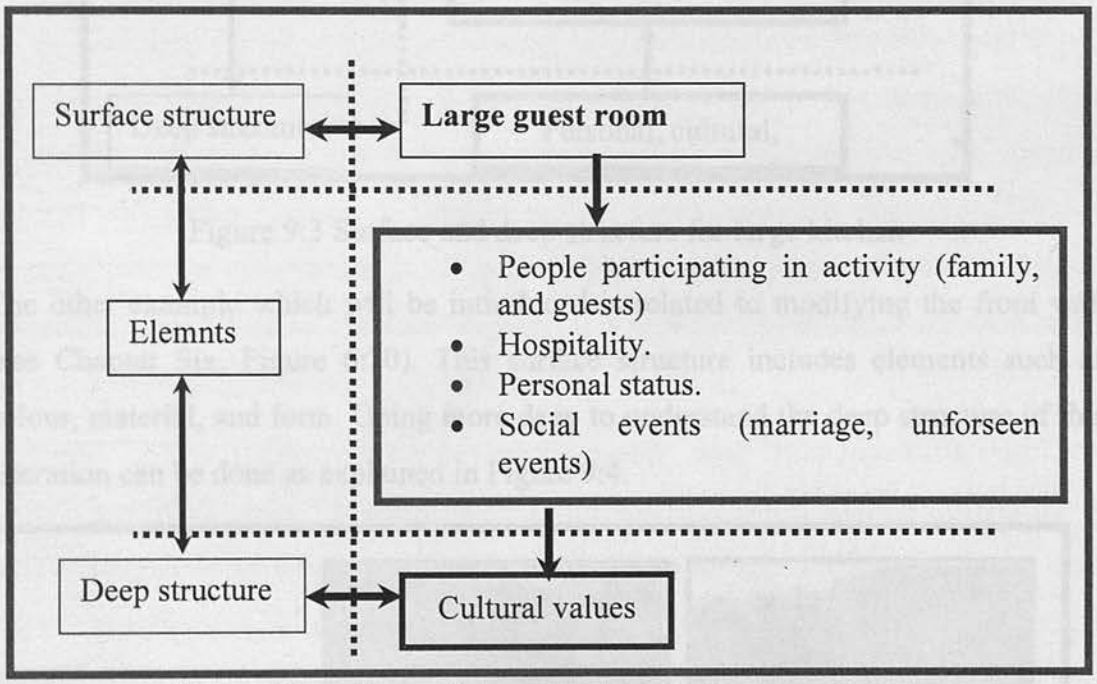


Figure 9:2 surface and deep structure for large guest room

As explained in Chapter Six, the importance of such space to Libyans could be explained as their need to participate socially with a huge number of people, their need to be hospitable as much as they can, the need for social status, as well as personalisation of such social space. Therefore, the deep structure is the cultural values which should be introduced, explained and understood by any designer participating in or producing Libyan homes. This deep structure is the hidden force for carrying out alterations to this space.

In the case of desire the to have a large kitchen, the author can assume that the deep structure for such need can be reached by analysing it as shown in Figure 9:3. The forces are: activity, generosity, hospitality, health, status and utility. These forces, as

explained in Chapter Six could be summarised under three main deep structures as shown in Figure 9:7.

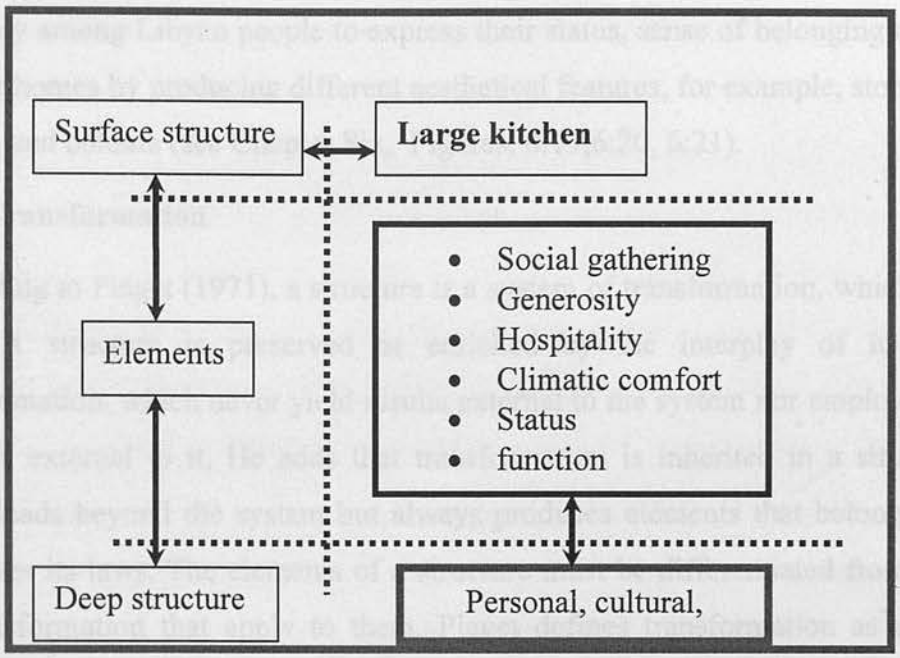


Figure 9:3 Surface and deep structure for large kitchen

The other example which will be introduced is related to modifying the front wall (see Chapter Six, Figure 6:20). This surface structure includes elements such as colour, material, and form. Going more deep to understand the deep structure of this alteration can be done as explained in Figure 9:4.

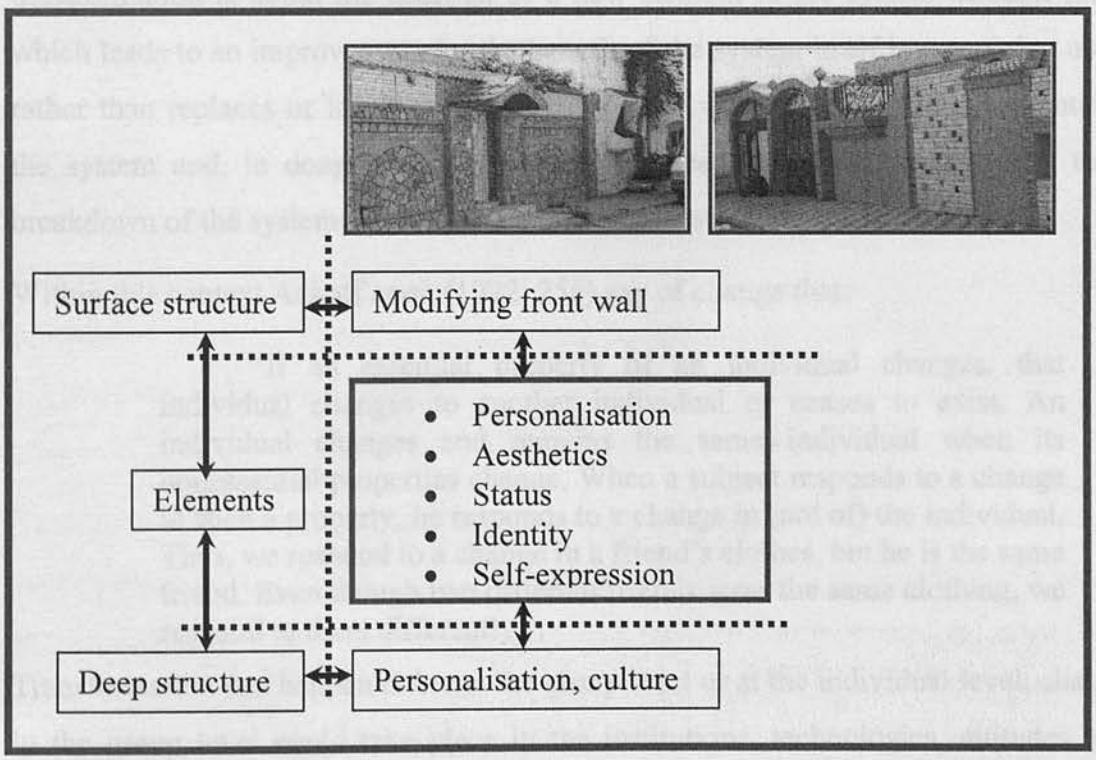


Figure 9:4 Surface and deep structure of modifying front wall

The main forces for carrying out such alterations could be personalisation, aesthetics, status, identity, and self-expression as discussed in Chapter Six. Generally, there is a tendency among Libyan people to express their status, sense of belonging ownership of their homes by producing different aesthetical features, for example, stones, metal, arches, and colours (see Chapter Six, Figures, 6:19,6:20, 6:21).

9.1.5 Transformation

According to Piaget (1971), a structure is a system of transformation, which includes laws. A structure is preserved or enriched by the interplay of its laws of transformation, which never yield results external to the system nor employ elements that are external to it. He adds that transformation is inherited in a structure and never leads beyond the system but always produces elements that belong to it and preserves its laws. The elements of a structure must be differentiated from the laws of transformation that apply to them. Piaget defines transformation as a constant process of passing from a simpler to a more complex structure. Hence, transformation is an ongoing process of change that could be applied to nearly all phenomena, for instance, the dwelling operates as a system of transformation of its elements, including all socio-cultural aspects.

El-Feki, (2003) differentiates between change and transformation, to him transformation is about the addition of a new element to the system through time, which leads to an improvement for the benefit of the system itself in a way that uses, rather than replaces or loses its structure. In other words, transformation maintains the system and, in dong so, crystallises it. On the other hand, change is a total breakdown of the system, from which a totally new structure might emerge.

Within this context Ackoff *et al.* (1972: 256) say of change that:

> "If an essential property of an individual changes, that individual changes to another individual or ceases to exist. An individual changes and remains the same individual when its nonessential properties change. When a subject responds to a change in such a property, he responds to a change in (not of) the individual. Thus, we respond to a change in a friend's clothes, but he is the same friend. Even though two different friends wear the same clothing, we respond to them differently".

Transformation can happen either at the group level or at the individual level, change in the group level could take place in the institutions, technologies, attitudes and behaviours that emerge within one generation, or over many generations. Transformation at the individual level, however, might be linked with particular life

events and might also be associated with normal individual progress and life cycle stages. On the other hand, the transformation of each phenomenon is carried out by its structure that belongs to the particular phenomenon and cannot be used by any other one (Islami, 1998).

The transformation process within alteration activities signifies time; some events in present time could create a mental image of the future. A dwelling gradually becomes a cultural institution for family members, especially children. When they join daily social activities, gradually, they become aware of the relationship between male and female members of the family, as well as among visitors. These activities could be considered as learning social values which reflect the value of the society.

There is a tendency for people when they are given house, they transform it, driven by that tendency which is inherent in the nature of things that people, according to structuralism, move from simple form to a more complicated form. In the context of this research people, were given small, basic dwellings, and they have transformed them to suit their needs, the result of these transformation is a complex form (see Appendix 5, all figures). Because the family in the progress of growth, needs to meet its expectations and this expectation will become bigger and bigger as a result, alterations will take place, one example of an alteration is adding a new flat for a new couple, or adding rooms for the separation between female and male family members.

The role of the dwelling as an activity centre is an indicator of the idea of transformation in the case of daily life activities and occasional social activities (such as wedding, and circumcision celebrations, etc.). In such activities, the laws of transformation accrue in the context of new regulations for interactions and the new, temporary space alteration emerges. The relationship between inside and outside suggests that most preparation for social events will be carried out in the back yard which, of course, is thereafter designated for female members.

Traditional dwellings are usually described in terms of their location, size, number of rooms, standard of finish and age. They often housed several generations of a single family, and underwent constant transformation, ranging from seasonal adjustments in use to longer term changes required by family size, sex and age of family members. The dwelling grew over time with the addition of rooms, each with its own door and window. The courtyard, naturally, shrank in size with the addition of new rooms. As it offers a valuable space for many activities, shrinkage of the courtyard was often

accompanied by utilisation of the roof, made accessible by the addition of an external stair. The dwelling, then, was a dynamic entity, responding continuously to the demands of its users.

9.1.6 Wholeness

Bertalanffy (1971) believes that if people look at merely the smallest part of the world in isolation, they will not be able to understand its complex relationships to the matrix with which it forms a total spatial and hierarchical system, hence, it is essential to consider things not as isolated parts, but to view things as interconnected, and to view systems as a whole. Wholes could be defined in terms of their structural laws; their whole laws of composition. According to the structuralist viewpoint, the whole is prior to its elements and it is not a simple juxtaposition of elements. Piaget (1971) explains that the logical procedures or natural processes by which the whole is formed are primary, not the whole itself which is the result of the structure's law of composition.

People are not isolated, they are part of society, and they want to be seen as part of it. Way of living, ritual, norms, Islamic teaching shared by the family as well as community, reflect a highly integrated system that cannot be understood, unless the dwelling is dealt with in a holistic perspective. The dwelling layout should be designed to reflect these notions. There is evidence that these were not addressed by public housing schemes and people felt that they were isolated, with no way to extend their roots within the community.

Wholeness considers the significance of subjective factors in understanding the objective phenomenon. The holistic understanding of the dwelling includes the residents who use it, the thoughts they have about it and the knowledge they create about it through time.

Generally, the dwelling is comprised of many layers of objective and subjective aspects, which are embedded in each other and connected to each other in a very complex structure. Regarding alteration, it is clear that many activities were connected together, such as, for example, increasing the height of the front wall which might indicate the need for privacy, or security, as well as personal motivation in terms of aesthetics.

Holism is recognised in the social system, as it is acknowledged in cultural norms, laws and practices that govern the individuals of any society. In modifying the guest

room, it could be assumed that the family has seeking privacy or visitors' privacy, or by adding more space it could be used for a family member for sleeping in. Harvard (1987) suggested that a structure is not an aggregation of elements, but an expression describing a set of relationships between things governed by some overriding formative law.

Structuralism, on the other hand, attempts to grasp reality as a whole, in which part and whole are seen simultaneously. Man relinquishes his autonomous position, as creator and giver of significance, to the totality of things, to the structure. It is the whole that gives the part its defining characteristics in that physical situation. If the whole did not exist, then the units would not be significant in the same way.

In the current research, respondents brought up answers which could be translated directly to the concept of wholeness, for example, the spaciousness of the guest room, which was considered important for many reasons, firstly, to accommodate a large number of visitors in social activities secondly, it supports the social status of the owners, thirdly, neighbours can use this space during unforeseen events, and it can be used for family members or visitors for sleep. Understanding the meaning of such space in a holistic approach by the architects will help people to activate and socialise their life.

9.1.7 Self-regulation

One of the basic properties of structure, which makes the idea of structure so important as a tool for the analysis of phenomena, is its self-regulation. Piaget (1971) emphasises that self-regulation may be achieved by various procedures or processes, and these can be ranked in order of increasing complexity. Rhythm, regulation and operation are the three basic mechanisms of self-regulation.

Self-regulation binds the laws of formation and those of transformation together. It restricts the system and account for its existence. The balance between the structure of and structuring aspects of any system represents the equilibrium which that system possesses, in terms of its innate ability to control its own internal processes. This property is often referred to as self-maintenance, feedback, homeostasis[2] or equilibrium. The processes that achieve self-regulation within structures can be seen

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[2] Homeostasis means the tendency of an organism to achieve a stable metabolic state by compensating automatically for changes in the environment and other disruptions. This term plays a central role in system theory.

to correspond to principles of hierarchy and are analysable in these terms (El-Feki, 2003).

The concept of equilibrium can be seen to exist in two main aspects: as a static or true equilibrium, or as a steady state or dynamic homeostasis, where the character of the system is preserved but its structure may shift to a qualitatively higher level of order in terms of complexity. A state of equilibrium must always be distinguished from the process of equilibration (Hamidi, 2003: 20).

Tracing the transformation of the dwelling, one can see the dwelling has continued through alteration to fulfil its role in Libyan society, in spite of ignoring many dwelling roles that were to be found in traditional dwellings and in spite of the changes which have accrued over the years. Historically, the dwelling was the place of production. Most food, particularly milk, butter, bread, clothes were produced in the dwelling (see Figure 9:5).

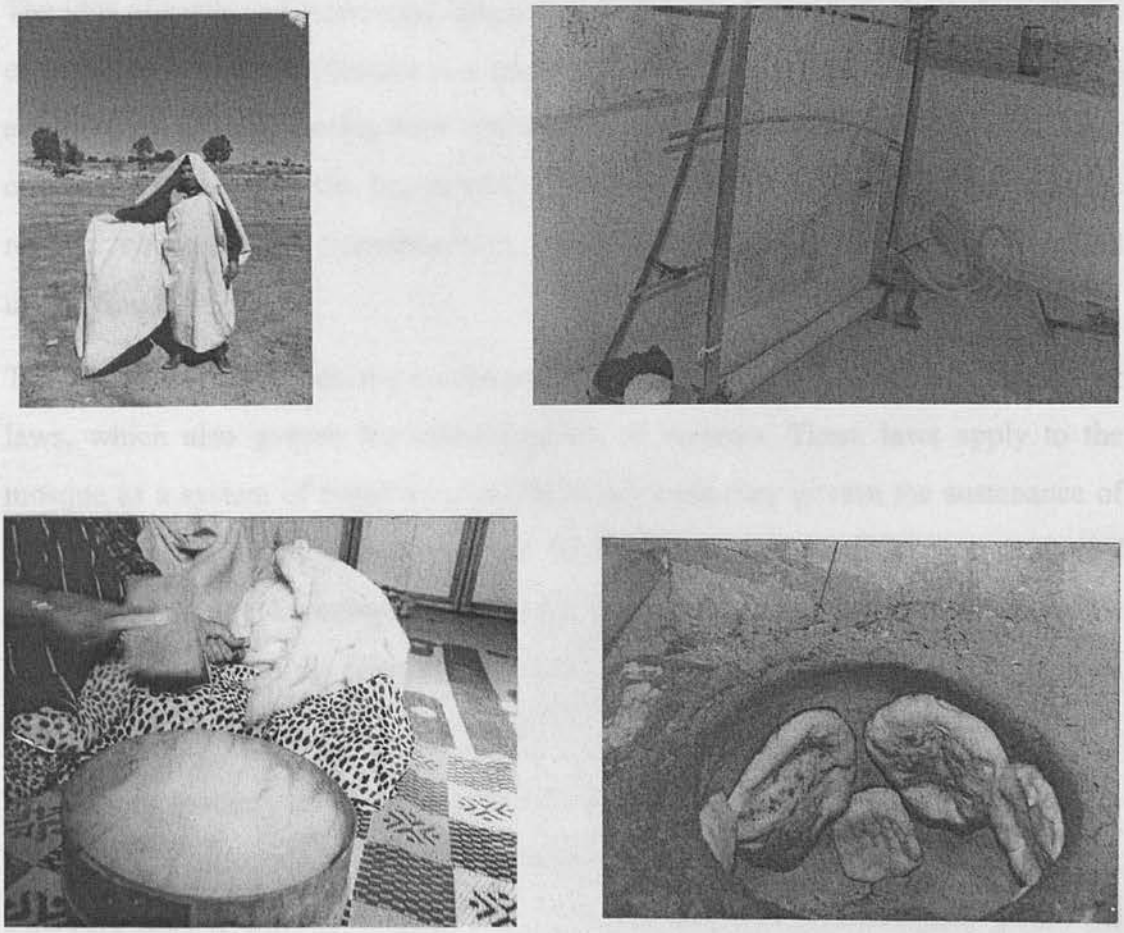

Figure 9: 5 home-produced traditional products (Source: the author)

This use of home as a place of production had an affect on the design of the traditional dwellings, such activities needed spaces which was highly recommended in traditional homes (see Chapter One) in recent designs such spaces were neglected.

Through alteration, the dwelling still plays a vital role in society, but in way that complies the current needs of residents.

Referring to the responses stated in Tables 9:5 and 9:6 the owners reported certain outlook about their family members support, which indicates the self-regulation structure and how it play a good supportive role in family life, for example, by adding new rooms for a newly married couple.

9.1.8 Laws of composition

Piaget (1971) stated that the relationship between the elements of a whole structure whole or a system needs to follow certain rules; these rules govern the transformation of the systems which they structure. The structural elements are co-ordinated to the rules and cannot exist independently, which characterise the whole from an aggregation

The idea of a rule is fundamental in a structure. It is the base upon which the concept of structure is built. A structure is a co-ordination of a set of rules. Structure implies a unified set of laws having their own internal logic (Hillier & Hanson, 1984). Not only the presence and the function of a structure depend on the rules but also the regular changes and transformation, made by following consistently applied underlying laws.

The relationship between the components of a structure is governed by particular laws, which also govern the transformation of systems. These laws apply to the mosque as a system of transformation, in which case they govern the sustenance of the mosque, its definition, its role and its meaning. This parallels the genotype / phenotype analogy, knowing that the genotype is the idea or the concept responsible for the production of the phenotype, which is the physical representation of such an idea (El-Feki, 2003).

Considering society as a main structure and a family is a sub-structure of it. Certainly the society is ruled by laws that come from cultural values such as religion, tradition, norms, these rules apply for the family too, and consciousness within the house about the existence of these laws does exist, if not, then alteration will be carried out to transform the situation to satisfy the resident's motivations.

The traditional dwellings are not the same as contemporary dwellings, a process of transformation has taken place, however, and there are common principles between

the first and the contemporary dwelling. It is not about a building but about the structure as a whole. The dwelling as an entity in built environment is a structure, and as a building is the expression of an idea. This idea has laws of composition, which are responsible for the reproduction of this unit. Thus, one can say that the architecture of the Muslim house to some extent was shaped by the law. In the placement of the door on the street; in the opening of windows; in the raising of the building; and in the treatment of the roof, there have always been rules which mediated with use to produce the appropriate forms. These rules can be looked at as 'the deep structure' or 'the system of arrangement' which held the different elements together (El- Hatloul, 1989).

9.1.8.1 Order

A structure is concerned with the ordered relation of parts to a whole, with the arrangement in which the elements are linked together. Based on this order, elements of a structure could be perceived by their unity into a structure of a higher order (Hamidi, 2003).

Levi-Strauss pointed out that structuralist attempts to discover the order behind various phenomena do not seek to compare phenomena with an order constructed in advance, but rather that reproduction, reconstruction and reorganisation are necessary in relation to reality. The self-organisation of a structure is an activity that can be carried out only by purposeful entities. It is the relationships between what the purposeful elements do and the search of their common purpose that gives unity and identity to their organisation.

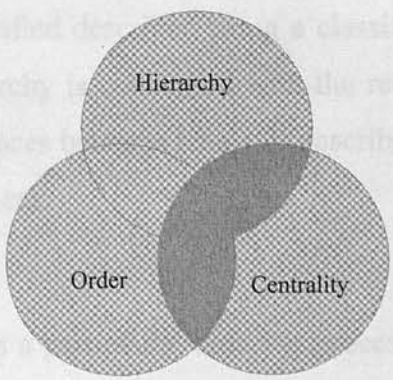

Figure 9: 6 Components of laws of composition
(Source: Hamidi, 2003; modified by the author)

Generally speaking, there are three sorts of consideration that tend to determine an

order: the psychology of the subject, the logic of the subject, and the physical circumstances of composition and presentation. Upton (1961) suggests seven practical working classification orders:

- Psychological order. This is defined as an order primarily determined by the emotional attitudes and interests of the interpreter.
- Structural order. This is a logical order derived from the relation of physical objects in space: for example, public, semi-private, private.
- Genetic order. This is a chronological and therefore logical order in which events occur when interpreted as being in a cause-effect relation to one another.
- Numerical order. This is a logical order in which a set of items has been arranged according to a regular series of numbers represented as modular or a grid.
- Scalar order. This is an order of rank, degree, an intensity or value.
- Conventional order. This type comprises an order of arbitrary arrangement such as alphabetical order
- Suitable order. This covers any order determined by circumstances of arrangement or presentation and not by the inherent logic of subject matter or the psychology of the communication. Upton (1961: 197)

Structuralism argues that a structure embraces a hidden dimension that brings order to its different phenomena and is responsible for the reproduction, reconstruction and reorganisation of these phenomena. Hierarchy is not a fixed property of a structure, but a process in which the components change and interact, responding to their regrouping. It is the ordered relation between the connected parts that make a whole, in a way that can be identified described using a classification of ranking and sub-ordination schemes. Hierarchy is concerned with the relationship between different levels of complexity interfaces between levels. It describes what generates the levels, separates them and links them.

9.1.8.2 Centrality

A basic tool we employ as a part of the ordering process is binary opposition, levi-Strauss stated that human thought has a binary nature. On this principle one of the themes which could represent the concept of centrality in the home is considering it as a point of departure, as a centre of the journey to work, abroad or just visiting a

friend; in this situation; the centre point is home. In other words, meanings are attributed to the phenomenon in terms of various dimensions that are transformed by the structure into their polar opposition.

9.1.8.3 Hierarchy

A structural hierarchy could be assumed to be a kind of rhythm, implying interaction between elements with the way the relation expresses themselves in reproduction or the continuity of interaction in time. According to the concept of field, which is borrowed from thermodynamic thinking as background to structuralist thought, any *unit* that is part of a field is significant for physical process, chiefly in so far as it is constitutive of, and constituted by, a higher order. This hierarchical property is not an aggregation of elements, but an expression describing a set of relations between things governed by some overriding formative laws. Self-regulation within structures can be seen to correspond to the laws of hierarchy. (Hillier & Hanson, 1984)

Waddington (1977) talking about structural hierarchy and functional hierarchy, claims that there is structural hierarchical in all nature, both living and lifeless. He suggests that being hierarch requires that the system controls its dynamic through an internal record which has some aspects of self-observation.

The hierarchy of the home can be seen from different perspectives. For example, there is a hierarchy in the roles of it as domestic spaces (e.g. public, semi-public, semi-private and private) and this is to do with the transformational process. There is also a hierarchy in the expression of the principles of clean and dirty spaces (e.g. front and back.), in addition to the hierarchy that exists in the physical elements of the dwelling as a building, in terms of their significance, and this is to do with the surface appearance and the deep meanings.

9.2 Conclusion

Home is more than a dwelling, it is a complex concept which cannot be understood unless tackled all together, in this chapter, an important concept has been introduced, structuralism. Decision makers and designers should rethink the concept of the dwelling, especially in third world countries, such as Libya. The author would like to state that this concept is not new, either to the reader or to the researcher, but thinking about dwelling in Libya should be within a theoretical framework, this framework should include the interpretation of all dimensions of human motivations

and structuralism, both of them should be integrated in such away as to formulate a good wide vision which considers all dimension of the Libyan society.

Human needs should be considered in terms of the hierarchy of needs, people need to express themselves, as well as the need for the basic motivations, such as eating or drinking water. On the level of dwelling, this means that people need the house to be more than that physical entity which is offered currently by government.

In part three of the current study three chapters were introduced, these three chapters formulate a model for evaluating the concept of home within any society, taking in consideration that the area of investigation could be the concept of home, human needs, or home as a structure and its meaning within the culture under investigation.

Conclusion, Discussion and Recommendations

10 Introduction

Evaluation always comes to an end where a report should be submitted with outcomes which will change the situation, changes in individuals' attitudes about a programme or raising an issue onto the public agenda.

This chapter summarises the discussions in the previous chapters and draws a number of conclusions. It begins with an overview of the whole thesis and it discusses the findings of the study, with particular attention to the alterations in public housing in the three neighbourhoods located in Tripoli city. It concludes with recommendations about improving dwelling design and possible areas for further investigation and it introduces a model for studying and understanding the phenomenon of dwelling alteration by using the concept of structure which derives from structuralism theory; this model should be used under the umbrella of POE.

10.1 Thesis review

As mentioned in the introduction, the main objectives of this research are to investigate the residential alterations that have occurred in public housing in Tripoli. The main research question is:

> **What types of alterations have Libyan public housing owners carried out in their dwellings and what are the reasons for these alterations?**

To evaluate this theme, a post occupancy evaluation approach has been adopted; the research is divided into three stages. The first stage (initiation) includes three chapters which examine three main sub-themes, these are: the Libyan context, the phenomenon of dwelling alterations, and the POE approach. The second stage (planning and analysis) comprises three main chapters: the research design and methodology, data collection techniques and data analyses. The third stage (understanding) went a step further with the major finding than that used in typical POE research. It includes three sub-themes: the connection of dwelling alterations and the concept of home, the theme of human needs, and suggests a way to understand this phenomenon by way of structuralism theory.

The methodology used in this study is based on that of previous post occupancy evaluation studies, from the general strategy of the research structure, to the data

collection and analysis techniques, as well as the factors used in the questionnaire. The nine chapters will be highlighted in the next few pages.

The research begins with an explanation of the situation in Tripoli. It is clear that the historical, socio-economic and political circumstances, as well as the oil boom in Libya, have led to rapid urban growth and social change.

After the 1969 revolution, dramatic change took place in Tripoli; colonial influence and European heritage were seen as undesirable. Street names were changed; all signs were written in Arabic only. Numerous emigrants were moved to urban centres, such as, for example, Tripoli, which resulted in a five-fold increase in Tripoli's population in the seventies and eighties. To accommodate this huge increase, the government built thousands of housing units in all Libyan regions.

In many parts of the developing world, where there is urgent need for new housing, the solution has been to construct modern forms, largely influenced by the philosophy of western countries, in which building technology has reached an advanced and sophisticated level. Generally, public housing in Libya has been a response to a situation of urgent housing need rather than the result of a long process of adaptation of dwelling design to the local conditions and to the specific needs of Libyan society.

In spite of the differences in typography, lifestyle and climate in Tripoli region, the common dwelling type is the courtyard house. This type of dwelling seems to satisfy the Libyan residents' needs as well as social values. In most modern housing, however, this courtyard element is neglected. The change of dwelling type, combined with the change in social life has occurred for many reasons, especially after the oil boom. The physical face of Tripoli has changed, the economy has expanded but religion and culture remain largely unchanged. Generally speaking, both architecture and Libyan society are in transition.

The second sub-theme highlighted in this research is the phenomenon of dwelling alterations (see Chapter Two). It is obvious that this field of study is rich in terms that derive from common usage but that are not clearly defined. Words such as 'alteration', 'improvement', 'repair', and 'adjustment' are open to loose interpretation. In addition, some researchers use term like 'transformers', others use

'extenders' or 'owners'. There is no fixed terminology. More attention should be given to using specific terminology that can be used simply and clearly.

Personalisation, privacy and control, as well as the relationship between adaptation and identity, are all reasons that might be considered as 'push' factors to carry out dwelling alterations. Moreover, many studies have indicated that family life cycle, income and housing deficits have a very strong correlation with residential alterations.

Most of the studies carried out focus on types of alterations, satisfaction with dwelling space and amenities within the dwelling as well as the neighbourhoods. In addition, they focus on the cost of the alterations and its process. They rarely consider it as a process resulting from the interaction between the residents and the concept of place making.

The third sub-theme in the present research (see Chapter Three) deals with the post occupancy evaluation approach and can be summarised as follows:

> **What is post occupancy evaluation? Its history and evaluation models could be used to evaluate the built environment as well as public housing in Libya.**

It is clear that there is no fixed method for post occupancy evaluation, no fixed and clear theory that can be considered as a theory for the POE approach. For example, many authors still consider evaluation of design solutions is difficult, for both experienced and inexperienced designers because firstly, in complex domains, no single person can know all the relevant criteria and constraints, secondly, design solutions must be evaluated from multiple perspectives, therefore, each case has its own situation which needs to be considered. Each evaluation model serves certain situations.

There have been a number of POEs conducted, but few contributions have been made to the theoretical development of the field. The history of POE in the UK shows that most of the investigations were oriented toward improving the performance of the building from the viewpoint of technical comfort; little has been done to respond to more philosophical issues of spatial experience and how users change and modify their buildings specifically (their dwellings). In addition, most of the POE studies limited their investigations to technical failures of the building and

POE was rarely used as a tool to investigate and improve the general policy of housing or the social context of the dwelling.

Part Two of this thesis includes three chapters, they are: Chapter Four which deals with research design and methodology, Chapter Five deals with data techniques and Chapter Six deals with data analysis. As the current research deals with residential alterations carried out in Libyan public housing, a model has been formulated to evaluate the alterations carried out by Libyan public housing owners. The research methodology for the present research (see Chapter Four) was based on the methodology of previous post occupancy evaluation investigations and a combination of different data collection techniques (see Chapter Five).

The main tool for data collection was a questionnaire, combined with a checklist which was used for physical measurements. The questionnaire includes five main factors. Generally, these factors deals with housing experience and satisfaction of the dwelling attributes as well as personal information. The other two sections deal with the ideal home and dwelling alterations. Two types of questions were addressed in the questionnaire, closed and open-ended. When wording the questions, the author was aware of using words and terms which were shared with the respondents and he was also conscious of the sensitivity of the phenomenon from legal scrutiny. Combined with this, the author introduced the questions' scales (see Chapter Five, sections 5.4.1.1; 5.4.1.2 and 5.4.1.3) for satisfaction, the Likert scale was also used, a household alteration scale, and facet theory techniques to ask questions about place experience.

In Chapter Six, data collected in the survey was analysed according to three principles, Statistical Package for Social Science (SPSS), space syntax analysis, and piling analysis for open questions. With SPSS, two main analyses were executed, descriptive analyses (see Chapter Six, section 6.1), and Principal Component analysis (Chapter Six, section 6.7). The comparison between the original dwelling design and the altered one was made by using space syntax theory (see Chapter Six, section 6.13.). The main findings will be discussed in the next section.

This data analysis phase led the author to rethink the findings and to think deeply to understand the owners' motivation that led them to carry out these alterations. The main chapters that resulted from this thinking are Chapter Seven, which talks about the concept of home and alterations, the context where alterations take place and it

covered some aspects which were not covered in the discussion in Chapter Six and at the same time, generated a new vision, which includes two main themes, the first one (Chapter Eight), human needs and alterations, and the second, home as a structure.

In Part Three of the current research, in responding to people's expectations and all the notions and themes that emerged from the research, which actually drew attention to the distinction between a dwelling as a physical entity, in terms of layout, design, statistics, in to a home which, holistically, expresses people's culture, feelings and sense of belonging.

The author felt that the best way to relate this to POE was to go beyond statistical perspectives to deal with more subjective issues. Chapter Seven dealt with the concept of the home and alterations. The discussion in Chapter Six had suggested a topic that was indicated but not completely explained by the alterations people made to their homes. In other words, the post occupancy evaluation had provided a range of observations that led to a more theoretical discourse, and to try to identify what 'the home' signifies to its users. The meaning of home, and the relation between dwelling and home, as well as the role of alteration was discussed. As a result, **alteration in the Libyan context should be considered as a process not as a result. It is a process of transforming dwellings in to homes.**

The key objective of Part Three was to introduce the concepts and theories which can be used to investigate and understand the home, to go deeper in to its broad meaning, of which designers need to be aware if they intend to produce homes more integrated to residents and their needs. Among the theoretical approaches, structuralism offers not just a doctrine but a method to explain and seek laws that guide almost any phenomenon. It offers a bridge between the physical realm and its underlying principles (Ujam, 2005).

10.2 Major findings

The major findings of the research emerged from both its theoretical and empirical methodologies. These findings formulate the contribution to the literature about dwelling alterations in Libya and POE as an interdisciplinary approach, as well as a way of understanding users' needs and values.

Libyan society is in transition, so is its architecture. The accelerated advancement of technology and its influence on communication, rapid urbanisation, population growth, the oil boom, and housing shortage has led to changes in the traditional

social and physical structure of the Tripoli region. In the past, the environment within which people existed defined their cultural setting, this, in turn, influenced their way of life and social integration. The adaptation over time to accommodate change in Libyans' needs, values and the built environment can be traced, for example, in their dwellings, especially the courtyard houses.

Nowadays, many of those values have been neglected and not fully considered in the new dwellings' design. It has been proved that the new typology of public housing in Libya does not fulfil Libyan needs, norms and values. (Daza, 1982, Essayed 1982; Abu-baker, 1996). The conflict between the new design criteria and Libyan cultural values, according to this research, is quite obvious and it is one of the main contributions of the current study to end disbelief of such a judgment. It is because of the misunderstanding of cultural values and the conflict between Libyan public housing design and people's needs that has led to the phenomenon of dwelling alterations.

10.2.1 Housing experience and satisfaction

Data collected by the questionnaire survey was statistically analysed using SPSS for Windows version 10. Two main analyses were used to examine data, descriptive and principle component analysis (factor analysis). The comparison between previous and current housing experiences showed that the space generally in the current dwelling is evaluated more positively than those spaces in the previous dwelling. The improvement in dwelling spaces and physical attributes does not mean that the owners were satisfied with all attributes of their housing environment; many attributes of the current dwelling failed to meet the residents' values and needs.

The dwelling size aspect was found acceptable for most of the sample, especially those families which did not have children of more than 20 years. In addition to the size of the dwelling, most of the sample was satisfied with the area of the bedrooms, on the other hand, they were dissatisfied with the number of bedrooms. Regarding the constructional quality of the dwelling, doors and window were evaluated positively and owners were satisfied with these features. It was noticed also that most of the owners who carried out alterations expressed such satisfaction.

One of the aspects that most satisfied owners was the back and front yards. The availability of such spaces helped the residents to carry out many social activities, in addition, they used such spaces to add new structures such as staircases or new

rooms. The roofs were used by most residents for sleeping or adding new spaces, the major alteration observed was modifying the parapet by increasing its height to give some privacy to a family.

One of the major findings does not relate to the physical features of the dwellings. What was disliked by most of the owners was 'public housing', a term that is not favoured by most of the sample. It seems that the meaning of this term implies that the residents of such housing do not have the ability to construct their own dwellings, they are not capable of offering a house to their families. This hides many deeply held values by the head of the family, since it is the responsibility of the head of the family to offer the house to his family.

Features that respondents were dissatisfied with were: the location of the main dwelling door, the location of the guest room door, the location of the living room. Interaction with visitors according the original design, has created a conflict between Libyan needs and values which emphasise socialisation between neighbours, and other family members.

Three main predictors related to satisfaction (see Chapter Six, sections 6.7.1; 6.7.2 and 6.7.3) emerged from the principal component analysis, these are: interaction with guests (both female and male), space for family members and inside-outside relationships. Privacy is the most important value held by residents. This value is deeply rooted in their culture, segregation between family members of certain ages, and between female and male visitors work as a regulator of their interaction. In traditional dwellings, this value has been resolved by different approaches. Dividing the space into two parts by mats or any piece of furniture can work as an obstacle between male and female spaces, allowing use of the outside space for male groups and the inside space for female groups. Privacy is connected to other variables such as crowding which revealed the dimension of the space for the family.

Housing as a concept is more than merely constructing a physical shell, it encompasses all the ancillary services and community facilities which are necessary to human well being, for example, it might be something as mundane as inadequate rubbish and litter collection services that would increase the refuse problems in and around public housing. In the three neighbourhoods under study, there is a shortage of external lights, good roads and paths, as well as a shortage of refusal disposal

facilities and a poor general appearance of the neighbourhoods. These aspects increase residents' dissatisfaction.

10.2.2 Space integration

The results that emerged from the statistical analysis related to the alterations that were checked by using space syntax analysis from physical measurements. Generally speaking, in spite of their satisfaction with some features of the layout of the original design, there was a general agreement amongst all respondents that the dwelling design was not appropriate for the Libyan values, as well as their daily social life. Because of a misunderstanding of the relationship between male and female members of Libyan society, the housing design was more integrated, especially in those domestic areas where it should have been more segregated, for example, in the entrance as well as in the living room, there were no designated spaces for female visitors which does not accord with the social regulation of the society which emphasises the separation between males and females. This point of view has been proved by space syntax analysis (see Chapter Six, section 6.13, 6.14). Increases in the main depth value, in all cases show that the dwellings as a whole are being created to have less contact with carrier space (public realm). In other words, dwellings are moving towards greater privacy. In the language of space syntax theory, the dwelling design is more integrated than usual. The visual comparison between the original layout and altered one revealed two main facts, these are:

- The **growth** of the dwelling, in terms of its size, space and form.
- Dwellings under transformation become more **complex** than the original layout.

According to structuralism, **complexity and growth** are the two main features of any structure theory.

10.2.3 Themes that emerged in the explanation for alterations

As mentioned previously, respondents altered their dwellings to meet their needs and values which had not been met by the original dwelling design. To understand these changes, one needs to analyse them in the context of the Libyan culture as well as the dwelling's role and meaning within the cultural context.

Thirty-five types of residential alterations were found, three main categories were used to identify residential alterations, these are: external alterations (see Chapter Six, section 6.9; 6.10 and 6.11 internal alterations, and others).

The subjects' income did not influence the frequency of alterations significantly. On the other hand, data analysis showed that there was a relationship between the total family income and alterations, however, respondents with children over 20 reported more alterations than others, by adding rooms on the roofs for their newly married sons. This action in itself can be considered a strength of the relationship between family members.

Adding new external elements, such as rooms for storage were undertaken by most of the owners who had carried out alterations. Three main spaces were significantly subject to space additions; the living room, guest room, and kitchen. Conversion activity was noted in three domestic spaces: the living room, kitchen, and bathroom. The main reason for these alterations is functional and to meet social requirements (for example, privacy, hospitality). Due to the area and position of the living room, respondents were often dissatisfied and as a result of the lack of privacy in the living room, they modified this space by converting it or adding space to it. The position of the living room to the guest room was not suitable for most respondents, since most female activities occur there or female visitors are entertained there.

The analysis of residents' evaluation of their bedroom space showed that their size was acceptable to most, even more to the point, there were no alterations noticed in such spaces, with the few exceptions of owners converting bedroom space when another bedroom space was freed up for use. The major quibble regarding the bedroom space was that while residents were satisfied with the area, they were dissatisfied with the total number of such spaces.

In most of the spaces which were added to the main dwelling and designated for sleeping, the area was less than the original, the same but not more. These bedroom alterations did not relate to size or position but to other factors, mainly to the age of the children and their sex. When the dwelling occupancy rate reached three people per room, this certainly would cause family conflict and 'push' them to add another space or use the living room or guest room to meet the need for additional space.

The survey revealed certain hidden dimensions at work as 'push' factors, such as family privacy, personalisation, social activity, and control and space deficit.

Alterations support many aspects of the subjects' life, for example, it was noticed that modification of the front façade supported the creative side of owners' personality, articulated his status in the community and increased owners' satisfaction.

Alterations, then, can be considered as positive factors which affect family life and the relationship between its members. From the family point of view (especially the father), it will increase his satisfaction when he can offer support to the family's new generation. The cultural tradition of the extended family living under one roof still persists and retains deep meanings that relate to the structuring of the society and human motivations. Hence, families tend to support their sons when they are first married, for example, by adding new spaces to the original building, on the roof if they have enough money, by adding new rooms, or a complete new flat.

The other positive aspect of alterations is in improving the family income by adding a shop to the dwelling. Economic investment was commonly cited to explain the reasons for undertaking alterations, especially by adding a new flat on the roof to meet the need for more space for the family and because of the difficulty of measuring the real cost of each alteration due to unstable local market conditions and there being no manual labour control.

The analysis of the alteration costs and its importance showed that adding rooms or a flat on the roof, adding a staircase, converting the living room, adding space to the guest room, are the most important and expensive residential alterations (see section 6.8.3).

Time is an important factor in achieving satisfaction in public housing. Generally speaking, it is a matter of balance between house design and owners' needs and values as shown in Figure 10:1. In stage one, if a balance is achieved

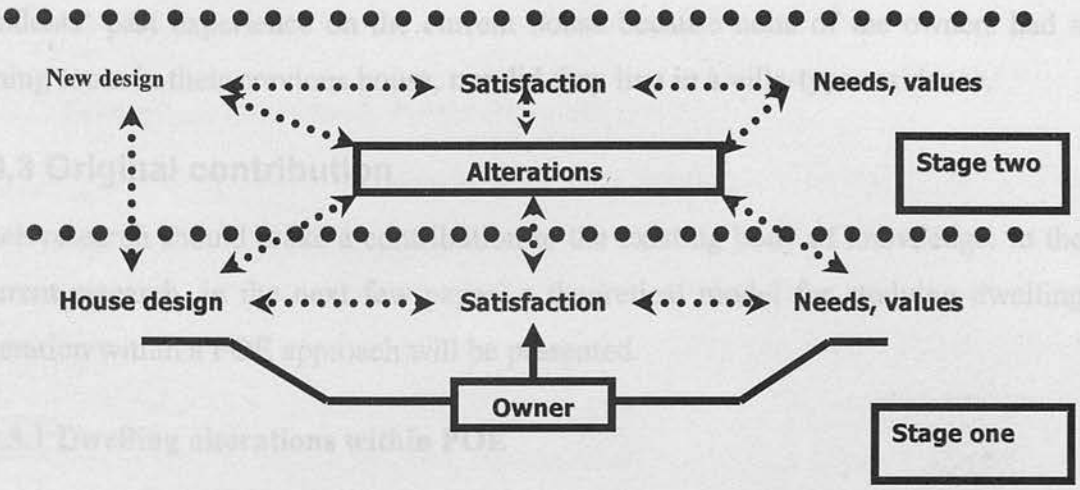

Figure 10:1 The state of balance

between human needs, values and aspirations, in terms of the house design, then residents' satisfaction will be achieved, otherwise, stage two will emerge whereby alterations, modifications and changes to the dwelling will occur.

There is a tendency for Libyan public housing owners to position the guest room entrance outside the dwelling to meet social requirements. The reasons for this are firstly, privacy for the female family members and female guests. Where it is possible, owners add another entrance to the dwelling to avoid such disturbance. Secondly, the respondents added space to the guest room for functional requirements, because all the social activities for the male members of the family take place in the guest room as well as using this space for sleeping.

This process of altering the dwelling begins by adding a staircase to access the roof space and modifying the parapet by increasing its height. If the family is able, the new rooms are all constructed at once, otherwise, one room at a time is added on the roof until the new flat is complete. This scenario, which occurred frequently among the survey sample, demonstrates how the concept of family values is still embedded in the cultural context and daily life of Libyans.

The analysis of the ideal home revealed significant information, which can be categorised in three main types of feature: functional, form and lifestyle. Most of the sample desired three main spaces: a guest room located outside the dwelling, a female guest room located in a proper position without any conflict with the family members' activity, more space in the kitchen, and other features which would reflect the family's lifestyle, such as an eating area, study area and a good style for the front

façade. The author thinks that such a finding contradicts the notion of the effect of residents' past experience on the current house because none of the owners had a dining room in their previous house, nor did they live in a villa-type residence.

10.3 Original contribution

Each research should make a contribution to the existing body of knowledge. In the current research, in the next few pages, a theoretical model for studying dwelling alteration within a POE approach will be presented.

10.3.1 Dwelling alterations within POE

Many researchers state that evaluation in general, and POE in particular, lacks a theoretical framework that can be adopted by evaluators in their interpretations of the area under study. This situation can be applied to the phenomenon of dwelling alteration, with the exception of the model which was introduced by Morris and Winter (see Chapter Two) where they used satisfaction as a model for studying dwelling alteration.

Most of the researchers have dealt with dwelling alterations within housing markets and housing shortages which has included a set of variables that were not situated in a theoretical framework, for example, Strassmann, (1977) suggests that dwelling alterations refer to population growth for poor countries, low rates of construction, housing shortages and upward filtering; Seek (1983) refers to housing investment; Gosling *et al.* (1991) consider this phenomenon as an integrated element in a dynamic market system; Salim (1998) suggests a bundle of variables, using satisfaction as a major common axis.

Studies refer dwelling alteration to the sum of those variables related to the housing market or the interaction between man and the built environment in general, lack that theoretical framework of alterations' interpretations and they are oriented towards general issues, neglecting residents' place-making concepts. To understand such a phenomenon in its broad meaning, a theoretical framework is required.

The phenomenon of dwelling alterations in the context of public housing in Libya, in the three neighbourhoods under investigation is the process of transforming dwellings into homes. According to the findings of the current study, the author will contribute to this phenomenon of dwelling alteration with a model which can be used

to understand and interpret these alterations with a powerful combination of two theories: structuralism and human needs, as explained in the previous two chapters.

10.3.2 Theoretical framework for dwelling alterations

The benefit to be gained from applying such an evaluation will be mainly in learning about how people create their own place and transform their houses into homes. In the current POE research, the author attempts to contribute to a model which can allow more understanding of the phenomenon of dwelling alterations. To learn about this phenomenon as a process, many theories can be used. The author suggests for the current model, two main theories, structuralism and human needs. Before giving an explanation of the model, there are a few aspects that should be considered, these are:

- Dwelling alterations should be considered as a process of transforming dwellings in to homes; it is a complex phenomenon, therefore, an in-depth understanding of it is required.
- Structuralists believe that the underlying structures which organise things together into meaningful systems are generated by the human mind, in other words, dwelling alterations is the surface structure of a deep meaning generated by owners to transform their dwellings in to homes. Therefore, to understand this phenomenon, a tool for understanding is required.
- The home should be considered as a structure, similar to the theme explained in the previous chapter, taking into consideration human needs and expectations. A structure is any conceptual system that has three main properties, these are:

  Wholeness. This means the home should be considered as a whole, not just as a collection of independent parts. And any sort of surface structure (alteration) should be related to a deep structure. (see Chapter Nine, section 9.3.6).

  Transformation. This means that the home is not a static entity but is capable of change. New meanings and expectations emerged during the life cycle of the residents (see Chapter Nine, section 9.3.5).

  Self-regulation. This is related to the idea of transformation, an element can be added to the system, at the same time, it cannot change the main structure (see Chapter Nine, section 8.3.7).

- The model requires a structure for organising information and requires more attention to be given to the choice of which types of structure and their elements should be considered. Therefore, each evaluation will need to select those structures and their elements which are more relevant to the particular study. The major structures which should be interacting to provide a degree of satisfaction to the user, in the author's experience, are cultural values and usefulness, bearing in mind that the users should be divided into groups, each group with a different point of view of what the home should offer to them.
- The major aim of this model is directing the evaluators to certain issues and problems, such as the conflict between the Libyan cultural values and public housing design. In other words, the other aspects of the evaluation theory are not considered in this stage such as, data collection techniques, or when, where, and why some methods should be applied.
- The proposed model, in its early stage, requires a strategy, an application method. The author suggests that any researcher should organise his/her study into three stages: the first stage should consist of understanding the historical background and cultural values of the sample under investigation. The second stage should include building the questions of inquiry and their methodology as well as data collection techniques, the third stage should include data analysis and interpretations, according to the suggested model.

10.3.3 Main model structures

To evaluate dwelling alteration carried out by the residents, four main structures should be considered:

1. Cultural values;
2. Usefulness;
3. Personalisation; and
4. Time and space.

Figure 10:2 indicates the major component of the model, keeping in mind that the cultural values are the core of this model.

10.3.4 Cultural values

People live in a certain zone and within certain roles, and laws. Generally, human life as we live and observe it, is not just a random, continuous flow, but displays recurrent patterns, regularities, characteristic ways of doing and being, of feeling and

acting, of speaking and interacting, all these can be considered forms of life (Ulin, 2001). In other words, they can be called culture and values. These values could be considered as a reaction of human beings to their environment. Culture[1] according to Belshaw (1972), covers everything created and produced by man. Rapoport (1991) argues that culture is a theoretical construct and only its effects and products can be seen.

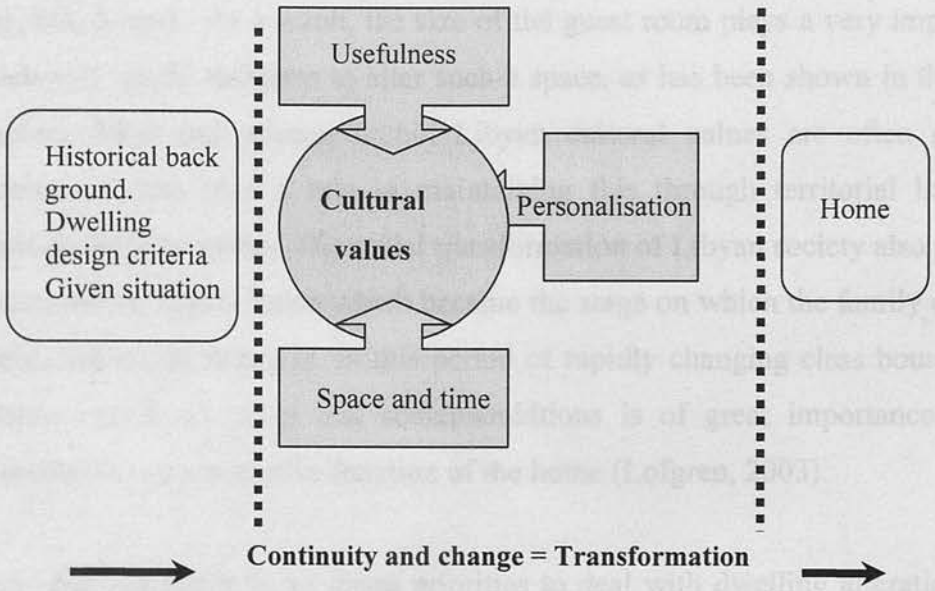

Figure 10:2. Main model structures: components of dwelling alterations.

To understand culture, Rapoport suggests dismantling it to culture and values. Cultural values in this context, include family, health, time, peace, religion, norms, lifestyle, neighbourhoodship, hospitality, folklore and many other elements.

Many studies indicate that domestic space demonstrates how these cultural values are related to design (Lawrence, 1987; Rapoport, 1980). These elements have an effect on the layout of the dwelling and people adopt their dwelling according to these roles. Type of society, for example, contain two main sub-structures such as, rural, industrialised, as well as family types, which in turn, include other elements

Social and physical spaces are two elements of the same structure and there is continuity and change in these dimensions over time. Domestic space in Libya is

[1] There are many definitions of culture, for example, the explicit and implicit behaviours, symbols and ideas that constitute the distinctive achievements of human groups (Kroeber and Kluckhohn, 1952). Or patterns of living (Brooks, 1968). Or that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities acquired by a human as a member of society (Tylor, 1974), or the means by which a community communicates ...a commonly agreed-upon set of meaning in interactions with one another (Steele, 1990), all these definitions cited from www.coe.sdus.edu

socially structured according to Libyan values. Within the context of the current research, many alterations can be seen as indicators of this structure. Hospitality in daily social life within Libyan families' norms and traditions motivate the owners to alter their guest rooms to suit their needs. Social identity also refers to the social organisation and cultural background. It is not the space itself that creates the home, but some kind of social actions that take place in the space, for example, having dinner or drinking tea together (drinking tea according to the Libyan way, takes some time, two hours). As a result, the size of the guest room plays a very important role which will 'push' residents to alter such a space, as has been shown in the previous chapters. Men and women within Libyan cultural values are often segregated. Architecture can play a role in maintaining this through territorial barriers and symbolic differentiation. The social transformation of Libyan society also produced a concept of the family home which became the stage on which the family displays its wealth and social standing. In this period of rapidly changing class boundaries, the communication of status and social ambitions is of great importance. This has increased the representative function of the home (Lofgren, 2003).

Such structure needs to be given priorities to deal with dwelling alterations and by evaluating each element of this structure, it can highlight much significant information (see Chapter Six, section 6.7.1).

10.3.5 Usefulness[2]

A dwelling will not become a home unless it services and offers the main architectural purpose, function and use. People can accept any type of dwelling when there are limited resources and they do not have a roof over their heads, however, once they do get a roof over their heads, they begin to think about changing the situation, and modifying the spaces according to their needs. Once they start dreaming about a home, the emotional values of home emerge but achieving these dreams cannot happen without alterations. Use, purpose and function are terms that

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[2] The author and his supervisor had a debate about the best term to use to explain the totality of 'purpose', 'function' and 'use'. In the end, they opted for 'usefulness' which includes the three terms mentioned previously. For further explanation, please refer to Richard Hill's book *Designs and their consequences*. According to Hill (1999), 'Purpose' denotes a human intention in relation to an object. 'Function' denotes the object's execution of that purpose. 'Use' refers to what goes on in a building (dwelling) and it stresses the notion of human activity, bearing in mind that it would be inappropriate to suggest that 'use' simply implies only one certain kind of activity. For example, a theatre auditorium is not just the shell in which the actors declaim their lines. Use is what happens in a dialogue between the user and with each part, element and corner of the dwelling.

have been used more or less interchangeably. Usefulness in this research is not just that pure function of space or the direct purpose of the artefacts that are made by human beings, it is more than that. Usefulness is a matter of values that are socially and culturally changeable; it is that function which can be achieved by expressing the self through hanging a picture on a wall, it can be achieved by locating oneself in a corner within the home, dreaming of one's future, or that pleasure which is achieved by whispering between couples in intimate space. This structure cannot be understood by designers of space or psychologists only. Users decide which part of the space is fit for certain purposes, or which element of the dwelling can be used for certain functions to achieve certain purposes over the course of time.

Activity within dwellings is at the core of *use*, as mentioned previously, Rapoport (1990) stated that activities are a direct expression of lifestyle and ultimately, of culture, and any activity should be seen as involving four elements, these are:

- The activity itself;
- How it is carried out
- How it is associated with other activities and combined into an activity system; and
- The meaning of the activity.

Levi-Strauss (1970) regarded cooking, for example, as a major discriminate between the human and non-human: only humans transform raw food into a cooked state. How people cook (or otherwise transform food) is already extraordinarily varied. How cooking is associated with other activities varies even more. The meaning of cooking, its ritual or social significance, is the most variable.

The use of the home can be seen in terms of the domestic plan layout, the relationship of spaces, one to another, and health and safety needs. The use of the home could be a personal one or for group or community use. Each level has its particular requirements, including cultural and must meet health and safety needs.

10.3.6 Personalisation

The third main structure is personalisation. In its broadest meaning, it includes many levels, and is a multi-level concept that includes firstly, the personal self, which refers to the awareness of one's body, thoughts, moods, emotions, perceptions, expressions and physical being. Secondly, the social self, which refers to the process

by which objects become objectified (the dwelling becomes a home) and thirdly, the cosmic self, which refers to the human drive toward a large harmony of things in general (Rochberg-Halton 1986, cited in Despres, 1991).

In terms of the personal self, the home acts as an important symbol to individuals within the home and to individuals out with it. People do not always intentionally communicate information about their social position but this can be decoded by others, through the interior and exterior character of a home. In the current study, decoration which has been carried out by owners is the reflection of their self identity. The materials chosen by an owner to modify his front walls also could be considered as a reflection of his personal and social identity, that is, how he wants others to see him.

10.3.7 Time and space

Space is a complex concept that has been subject to numerous philosophical, scientific, and social discourses. Kuper (2003) added that it should be borne in mind that the differences between space and the experience of space should not be confused. In other words, its values are attached through facts of social space and personal existence and that epistemologically, we must be wary not to see space as a feature of the physical world. Space can be divided in to three main categories: physical, ecological and structural, according to Durkheimian structuralism (cited in Kuper, 2003). Physical space is the most concrete and measurable; the ecological being a relation between communities, defined in terms of density and distribution, with reference to natural resources; and structural, as the relation between groups of persons in social systems, expressed in terms of values (Evans-Pritchard, cited in Kupe, 2003).

Design can be seen as organising space for different purposes and according to different rules, which reflect the activities, values, and purpose of the individuals or groups (Rapoport, 1982). Integrating physical space within social space, in the context of Libyan cultural values, will produce some rules that will determine the position, size and the decoration, as well as the use of the space. In other words, and according to Libyan values, evaluating spaces within a dwelling needs to be undertaken according to their social meaning, rather than their physical properties. More specifically, the position of the guest room, according to the results of the current study, should be analysed according to the meaning it has for the owners, which is, that this space should be separated from the main spaces in such a way that

it gives more opportunities for both sexes to socialise appropriately and to personalise it.

Time, by its very definition, is not as simple as space. The author does not intend to deal with a philosophical explanation of the concept of time, rather, he is concerned to connect the concept of time with space, within dwelling alterations and those activities which take place in the spaces at certain times and how that affects the concept of the home. In this context, time can be divided into many elements, in each period there are certain activities that occur. Lunch time is the most important time for Libyan families, when all the family are together. This event represents the strong ties in the family and architecture and the organisation of space certainly plays a role in strengthening these bonds. The second example is the evening time, when social activities take place in the guest room. The role of that space then is to offer good opportunities to socialise.

At times of marriage and other social celebrations, these too have an effect on the home. For example, if a member of a family decides to marry and the family agrees to certain arrangements, the likely effect is one which will lead to dwelling alterations and such arrangements take time to prepare. To accommodate the marriage celebrations, the dwelling extends, even beyond its physical boundaries up to the street, where all the neighbours will join the party and offer their guest rooms to other visitors.

10.4 Recommendations

The findings of the current research suggest a number of recommendations which are directly applicable to the programming and the design of future public housing in Libya. These recommendations are divided in to three levels: the first level is oriented to the POE approach and Libyan government policy; the second level deals with theoretical considerations and suggestions about factors that need to be addressed during the design of the housing environment; and the third level is oriented directly to the dwelling layout.

10.4.1 POE within Libyan government policy

As a developing country, Libya faces challenges on many levels which need to be reviewed, such as housing policies, the design criteria for new dwellings and ways of working that were introduced during the last decades but that are no longer working

well or relevant to current housing situations. It is invaluable to gain from past experience, to take forward best practice but to learn from mistakes, especially in those housing projects where many resources have been and still need to be spent, however, past solutions might be inappropriate today. This research has shown that public housing in Libya has not fully met Libyan users' needs and expectations. It requires a re-think about public housing policy, one which reflects users' criteria of a more holistic concept of the home and it needs to determine what actions produce homes instead of houses, or at least, what actions provide houses which could be transformed into homes, by allowing for important aspects to be reflected and developed, such as Libyan cultural values, life style, ecological perspectives and many other personal aspects, all of which can transform a house from simply the physical construct, into a home. This cannot be achieved unless investigations are undertaken on many topics related to housing in general. To achieve this, the government needs to activate the concept of POE within government policy on two main levels. The first level is creating POE agencies which can investigate and carry out such studies on government plans. The second level is the concept of introducing POE into the academic environment, especially in architecture education. Recently, many institutions have offered such a curriculum in their teaching programmes. Students, through carrying out POE, will learn about their culture, about their clients' needs and values, and perhaps, they will reach the stage where both parties are speaking the same language.

Because of the rapid growth in Libya and the lack of expertise, especially in the field of design and the built environment, the need is urgent to adopt a post occupancy evaluation approach, at both academic and government levels. Academic institutions should add a post occupancy evaluation approach to the curriculum. The government should pay attention to social values and traditions by evaluating previous projects to learn from the failures and successes of those projects, given that it is important to learn from the past since previous solutions might be responsible for the current problems.

10.4.2 Cultural values

Before embarking on the design stage for public housing units, it is necessary to have understood fully the cultural values of Libyan society, their development, and their influence on the life style which ought to be reflected in dwelling architecture. It is

outwith the bounds of the current study to cover all cultural values. Certain dimensions only will be discussed.

10.4.3 Women's role

Women's role in Libyan society must be given attention by housing policy decision makers and those values which shape their built environment and their habitat must be understood. One of the major issues which should be analysed is women's position in Libyan society. Women, in traditional Arabic built environments, were shown great consideration. This attitude is greatly affected by Islam and a mixture of local traditions. Sex, age and social status influence a great deal of family behaviour as well as that of visitors. In some cites, special routes for circulation were nominated for women only (in a traditional city, such as Gadams, women use the roof for circulating between dwellings).

10.4.4 Neighbourliness

To understand fully the cultural values of Libyan society, it is necessary to consider too the dwelling design from the point of view of the range of social events most of the neighbours will support. Crucial to the way Libyan families deal with each other, and which reflect their values and norms, is their willingness to support their neighbours, especially at social events. When a family faces such events, it needs help in preparing food, which requires having as big kitchen as is possible to give neighbours the chance to share in preparing the food. In the case of the dwellings in this research study, the kitchen space in the public housing units was small, compared with the private dwellings, as well as being imperfect in terms of climatic conditions, especially in summer, which usually leads to relocating the position of the kitchen to the back yard.

10.4.5 Hospitality

In Libyan culture, there is an expression said to guests which is: "it is your own house", which reflects hospitality and warmth to the guest. The clear way hospitality and warmth is shown to guests is by offering them a guest room, which should be located in a position which will not affect the family's privacy, such as almost in the front yard and with an entrance that does not cross the main entrance to the house.

The second dimension which should be considered is climatic conditions and environmental factors, to assess their impact on the design and judge how they can

best be accommodated. This needs research evaluations to investigate climatic variables and the situation outside and inside the dwellings. At the same time, a study of local materials and their specifications can be undertaken to judge which materials work best in terms of heat gain and loss vis-à-vis particular public housing building design plans.

The aim of the built environment is to respond to human needs and motivations, therefore, varying attitudes such as sociological, psychological and people's constant and deeper preferences have to be considered. To achieve this, architecture education needs to offer teaching programmes to its students where they can learn how to evaluate the vast range of aspects which make up the built environment both the traditional and modern one.

10.5 Design aspects

This section of the recommendations is related to the dwelling unit design. From the previous discussions, there are many concepts which should be considered in designing Libyan public housing such as:

The cultural values associated with Islam which is considered very important for Libyan society. As the design of housing is closely related to user satisfaction, the layout of dwellings should reflect residents' cultural values. The following summarises the findings with regard to people's homes:

Dwelling elements: it is clear from the current study of public housing units that many facilities are missing which are necessary to its residents, these are: a female guest room, laundry, study area, storage and roof accessibility. These elements, along with the basic elements, should be formulated in a relationship as indicated in Figure 10:3.

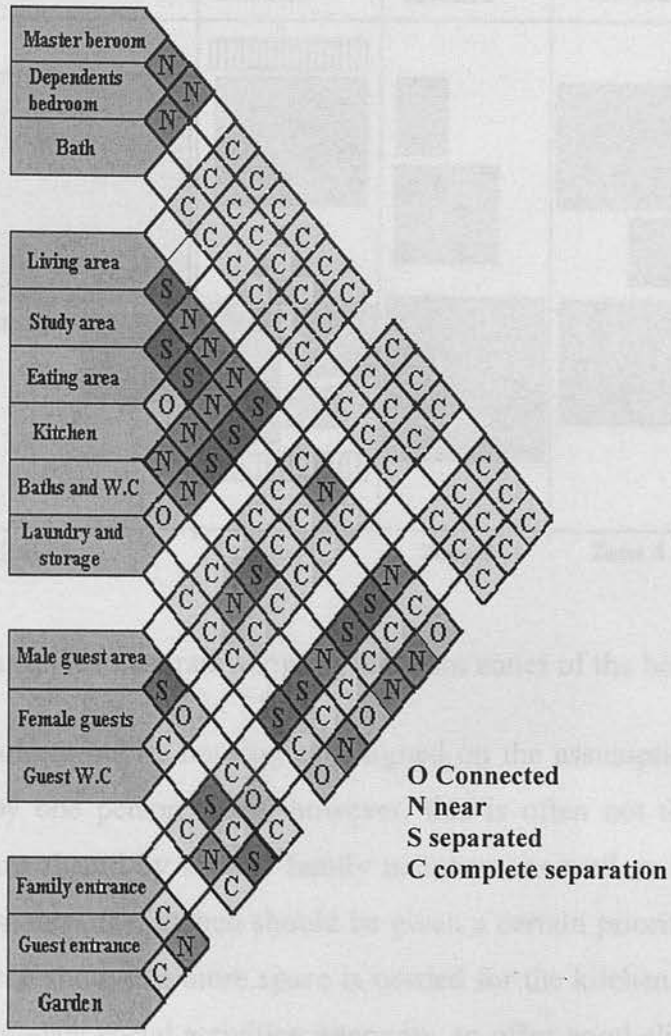

Figure 10:3 Relationships between house elements

To provide the required privacy for a family, access to the dwelling (private space) of the family domain should be separated from the public domain. This is best achieved through a hierarchy of access levels from public to semi-private to private spaces. The dwelling should be divided into four zones as shown in Figure 10:4.

The design of the entrance area of the dwelling should allow direct access to the guest section and the family space separately, if required. Therefore, the entrance to dwellings should be designed as a lobby with two doors, one to the guestroom and the other to a family room (kitchen or corridor).

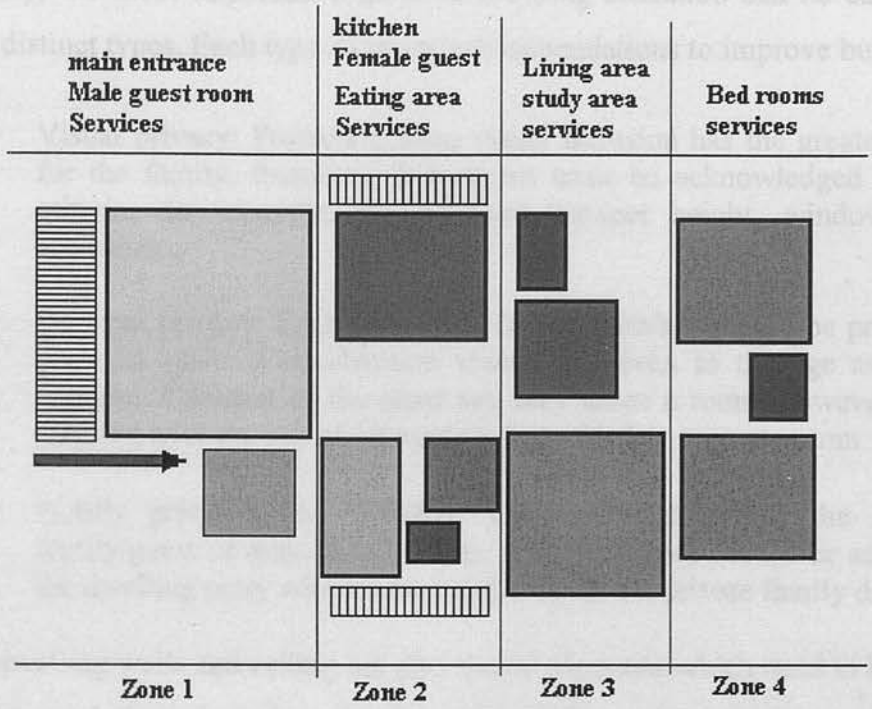

Figure 10:4 Diagram showing the main zones of the house

The kitchen in current public housing is designed on the assumption that activities are carried out by one person alone, however, this is often not the case, because many activities are shared by several family members, as well as by guests during social events, therefore, the kitchen should be given a certain priority. The results in the current research show that more space is needed for the kitchen for two reasons: firstly, to accommodate social activities; secondly, to offer good climatic conditions when carrying out activities. The location of the kitchen, then, should be re-evaluated. The results also show that most of the owners who alter their dwellings change the ceramic tiles of the kitchen walls, making it easier for them to be kept clean and washed, therefore, instead of making them 1.5 m in height, it would be much better if this height was increased.

The living room should be separated from the female guest room; the size of the living room seems to be sufficient for family activities, however, to find out the perfect size, the type and size of the furniture should be considered.

Each dwelling should have access to the roof since many activities occur there: celebrations, marriages, and sleeping in summer. This will affect the height of the parapet which should be not less than 1.5 m to achieve the necessary visual privacy for the family.

Privacy, the most important criteria in dwelling alteration can be categorised into four distinct types. Each type suggests recommendations to improve building design.

- Visual privacy: Protection from visual intrusion has the greatest importance for the family, therefore, this aspect must be acknowledged in the design criteria, for example, by adequate parapet height, windows and main entrances.
- Personal privacy: Each individual family member should be provided with a personal space. Consideration should be given to the age and sex of the children. Children of the same sex may share a room, however, any family member over the age of 15 needs to have his/her separate room.
- Family privacy: The dwelling design should permit the separation of family/guest or male/female areas. The guest area should be accessible from the dwelling entry without the need to cross the private family domain.

The dwelling walls and ceiling are also spatial elements which need to be considered. Recommendations include: reducing the window size which would give more opportunities to use the wall to hang photographs and decorations and more control for the internal climatic environment.

Further investigations

The author of this study would not claim to have produced a fully-rounded and tested theory, and he appreciates that it may have certain problems and limitations of its own. Significantly, he feels that further research work needs to be undertaken. The issues related to this subject cover an enormous and varied range, therefore, they need more investigation to produce results that can be integrated into the findings and recommendations that the author's study has provided here. In that way, a greater body of evidence would result and a more established and integrated approach, based on the author's initial findings will become evident.

The built environment within which people exist, defines their cultural setting, therefore, many questions need further investigations such as, what are the important values of Libyan culture which should be reflected in their built environment, particularly in their homes? What are the sociological changes that have arisen due to the 'new' Libyan culture? What are the physical, spatial characteristics and values that should be conserved? What are the methods and meaning which should be adopted to conserve and protect sustainable traditions?

Legislation and codes of best practice for users should be written by local authorities for existing dwellings and their transformation and operational standards should be maintained from the point view of health and safety issues.

This research has presented a vision for the future of public housing policy and made exploratory inquiries about many new ideas which are related to housing in general, as well as to public housing dwellings in particular. One issue which needs to be addressed is the psychology of the Libyan people and their relationship and attitude to the built environment. The availability of such studies will offer many new design dimensions to professionals and decision makers, for example, residents' perception of spaces, the size of theses spaces, colour preferences and why these factors are important.

Architects and other professionals must attempt to establish new symbolic systems. To get them accepted, they have to communicate them to users which can only be achieved if both architects and users communicate better and there are mechanisms in place to support continuous dialogue. Users' perception, understanding and realisation of the concept of home must be taken in to consideration by professionals, relevant to users' culture, norms, social values and their 'new' lifestyle. This could be achieved by investigating the images preferred by users as well as the meaning of home to them. According to the findings of this research, three main spaces should be investigated further: the size and location of the guest room, living room and the entrance(s) to the dwelling.

These aspects are beyond the limits of the current study but since the facts are clear and the knowledge is now available, serious consideration should be given to these matters.

The researcher would like to state that there are many changes which have taken place in the external spaces of the dwelling plots which also need to be investigated. This aspect can be covered under the community space dimension which might activate social interaction amongst neighbours.

The author hopes that the research will contribute to a better understanding of the nature of alterations in public housing in Libya and how it should be dealt with. The main contribution of this study has been in providing the researcher himself with a proper approach to his academic career and practical profession, as well as for others who have the same research interests.

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Appendix 1

Housing questionnaire
Tripoli region Libya

Date: .....
City: .....
House number: .....
Neighbourhood number:.....

I would like to ask you about your recent and previous house please write in the response box the number that most closely to your answer.

Section A : Housing quality (HQ)	Previous house	Present house
HQ1. What is (was) the type of the dwelling unit? [1]- Single household detached house [2]- Underground house [3]- Apartment/ flat [4]- Courtyard house [5]- single attached house [6]- row house with front and back yard [7]- Other (please specify).....		
HQ2. Who is (was) the owner of the dwelling unit? [1]- Belongs to head of household [2]- Belongs to another member of the household [3]- Belong to another family member [4]- Rented unit from private landlord [5]- Rented unit from the government [6]- Other (please specify).....		
HQ3. How did the house come into your possession? [1]- Bought from state housing [2]- Bought from individual [3]- Inherited alone [4]- Inherited with others [5]- Built [6]- Other (please specify).....		
HQ4. What is (was) the total number of rooms in the dwelling. state number of usable rooms, include kitchen and bathroom/toilet rooms		
HQ5. How many separate rooms does (did) the household occupy? (State number of usable rooms, include kitchen and bathroom/toilet room)		
HQ6. What material is (was) the roof mostly made of? [1]- Concrete [2]- Hollow clay blocks		
HQ7. What material are (were) the walls mostly made of? [1]- Earth [2]- Stone [3]- Cement blocks [4]- Lime stone blocks [5]- Hollow clay blocks [6]- Other (please specify).....		

Section A : Housing quality (continued)	Previous house		Present house	
HQ8. How many married persons share (d) the house?				
HQ9. How many living rooms are (were) in the dwelling unit? Please indicate whether they are. **[1]**small **[2]**medium **[3]** large	Number	Area	Number	Area
HQ10. How many bedrooms are (were) in the dwelling unit? Please indicate whether they are. **[1]**small **[2]**medium **[3]** large	Number	Area	Number	Area
HQ11. How many guestrooms are (were) in your house? Please indicate whether they are. **[1]**small **[2]**medium **[3]** large	Number	Area	Number	Area
HQ12. How many kitchens are (were) in the dwelling unit? Please indicate whether they are. **[1]**small **[2]**medium **[3]** large	Number	Area	Number	Area
HQ13. Do (did) you have a storage inside your house? Please indicate whether it is **[1]**small **[2]**medium **[3]** large	Yes□ No□		Yes□ No□	
HQ14. Do (did) you have enough space in the back yard of the house? Please indicate whether it is **[1]**small **[2]**medium **[3]** large	Yes□ No□		Yes□ No□	
HQ15. Do (did) you have enough space in the front yard of the house? Please indicate whether they are **[1]**small **[2]**medium **[3]** large	Yes□ No □		Yes□ No □	
HQ16.Do (did) you have a garage inside the fence of your house? [1] Yes [2] No				
HQ17. Do (did) you find the internal space of your house suits your furniture? **[1]** Yes **[2]** No				
HQ18. How about the size of your windows, is it; [1] To big [2] About right [3] To small				
HQ19. How about the size of your doors, is it; **[1]** Too big **[2]** About right **[3]** To small				
HQ20. Do you find your house comfortable during summer? **[1]**-Yes **[2]**- No	Day summer	night summer	day summer	night summer
HQ21.Do you find your house comfortable during winter? **[1]**-Yes **[2]**- No	Day winter	night winter	Day winter	night winter
HQ22.What is the most important feature of the house that you dislike? **[1]**- Not enough rooms **[2]**- No good appearance **[3]**- No play ground for children **[4]**- Not enough space **[5]**- Others				

HP23-Would you please tell me three important features that you would like to have in your ideal house? And mention two reasons why?

1.....

A.....

B.....

2.....

A.....

B.....

3.....

A.....

B.....

I would like to ask you about your satisfaction with your present house, please tick, where it is appropriate

HS [A1] - would you please tell me when did you move to this house?

[1]- Up to 5 years ago □
[2]- Up to 10 years ago □
[3]- Up to 15 years ago □
[4]- More than 15 years ago □

HS [A2] - Do you own another house Yes □ No □

HS [A3] - How satisfied are you with the following aspects of your home?

[1] Very satisfied	[2] Satisfied	[3] Neither satisfied nor dissatisfied	[4] Dissatisfied	[5] Very dissatisfied

	1	2	3	4	5
HS [A4]. Size of your house	□	□	□	□	□
HS [A5]. Floor to ceiling height	□	□	□	□	□
HS [A6]. Space of the bedroom	□	□	□	□	□
HS [A7]. Space of the guest room	□	□	□	□	□
HS [A8]. Space of the kitchen	□	□	□	□	□
HS [A9]. Space of the entrance	□	□	□	□	□
HS [A10]. Space of the bathroom	□	□	□	□	□
HS [A11]. Circulation within your house	□	□	□	□	□

HS [B] - How satisfied are you with the following aspects of your home?

[1] Very satisfied	[2] Satisfied	[3] Neither satisfied nor dissatisfied	[4] Dissatisfied	[5] Very dissatisfied

HS [B1]. Level of privacy in your bedroom
For relaxing when other occupants are also at home □ □ □ □ □

HS [B2].Level of privacy in the living room
for relaxing when the other occupants are also at home □ □ □ □ □

HS [B3].Level of privacy in the living room
for relaxing when you have visitors in the guest room
and other occupants are also at home □ □ □ □ □

HS [B4]. Amount of space the living room for doing tasks
when the other occupants are also at home □ □ □ □ □

HS [B5].Level of privacy in the guest room for relaxing
when the other occupants are also at home □ □ □ □ □

HS [B6]. Amount of space in the bedroom for relaxing
when the other occupants are also in the home □ □ □ □ □

HS [B7] Amount of space in the living room for relaxing
when the other occupants are also in the home □ □ □ □ □

HS [B8]. Amount of space in the guest room for doing tasks
when the other occupants are also in the home □ □ □ □ □

HS [B9]. Amount of the space in your home as a whole
for relaxing when the other occupants are at home □ □ □ □ □

HS [B10]. Level of privacy in your home as a whole
When the other occupants are also at home □ □ □ □ □

Some people have concerns where the rooms are in their homes in relating to one another.

[1] Very satisfied	[2] Satisfied	[3] Neither satisfied nor dissatisfied	[4] dissatisfied	[5] Very dissatisfied

HS [C] - How satisfied are you with the following aspects of your home?

	1	2	3	4	5
[C1].Position of the entrance to the living room	□	□	□	□	□
[C2]-.Position of the entrance to the guest room	□	□	□	□	□
[C3]-Position of the kitchen to the living room	□	□	□	□	□
[C4]-Position of the living room to the bedroom	□	□	□	□	□
[C5].Position of the kitchen to the guest room	□	□	□	□	□
[C6]-Position of the kitchen to the bathroom	□	□	□	□	□
[C7].Position of the kitchen to back yard	□	□	□	□	□
[C8]-Position of the bathroom to the guest room	□	□	□	□	□
[C9]. Position of the bathroom to the bedrooms	□	□	□	□	□

Some people have concerns about the material and fittings in their homes, for example the kitchen fitting or electricity or building finishes.

[C10]-In general how would you evaluate the following as they relate to your housing, would you rate them as being good, average, or poor?

	Good	Average	Poor
[1]- Electricity supply	[ ]	[ ]	[ ]
[2]- Domestic water	[ ]	[ ]	[ ]
[3]- Recreation facilities	[ ]	[ ]	[ ]
[4]- Public transportation	[ ]	[ ]	[ ]
[5]- Sewage system	[ ]	[ ]	[ ]
[6]- Street lighting	[ ]	[ ]	[ ]
[7]- Ventilation inside dwelling	[ ]	[ ]	[ ]
[8]- External building finishes	[ ]	[ ]	[ ]

[C11]- Are the refrigerator, stove and sink situated in a way that they can be used without difficulty? Yes □ No □

[C12]- Do you have enough cupboard space in the kitchen? Yes □ No □

[C13]- Do all windows and doors open and close properly? Yes□ No □

[C14]- Are there any gaps to outside (e.g. under doors, or around windows)?
Yes □ No □

Now I would like to ask you about your satisfaction with your neighbourhood

NQ- How satisfied are you with the following aspects of your neighbourhood?

[1] Very satisfied	[2] Satisfied	[3] Neither satisfied nor dissatisfied	[4] dissatisfied	[5] Very dissatisfied

	1	2	3	4	5
NQ1. Privacy from neighbour	□	□	□	□	□
NQ2.The noise level in the area	□	□	□	□	□
NQ3.lighting level of public area	□	□	□	□	□
NQ4. General appearance of the neighbourhood	□	□	□	□	□
NQ5. Proximity to transportation	□	□	□	□	□
NQ6. Proximity to store or market	□	□	□	□	□
NQ7. External colours used for houses	□	□	□	□	□
NQ8. Nearness to health facilities	□	□	□	□	□
NQ9. Nearness to educational facilities	□	□	□	□	□
NQ10. Adequacy of refuse disposal facilities	□	□	□	□	□

NS11.How likely would you be to recommend this place to someone you know as a place to live?

Very likely □ Likely □ Unlikely □ Very unlikely □

NQ12. Are you satisfied with parking facilities for:

A-People that live in your house? Yes □ No □

B-Visitors? Yes □ No □

NQ13. Has your home ever been broken into or burgled?

Yes □ No □

Now I would like to ask you about changes and modifications you carried in your house
HA1. Have you added, modified your house? Yes □ No □

If yes, would you please name each intervention, change, alteration, modification you have made in your current home.

Alteration 1

.....

.....

Very expensive □ Expensive □ Inexpensive □
Very important □ Important □ Unimportant □
Would you please give me two reasons why you carried out this **Alteration**?

1.....

2.....

Alteration 2

.....

.....

Very expensive □ Expensive □ Inexpensive □
Very important □ Important □ Unimportant □

Would you please give me two reasons why you carried out this Alteration?

1.....

2.....

Alteration 3

.....

.....

Very expensive □ Expensive □ Inexpensive □
Very important □ Important □ Unimportant □

Would you please give me two reasons why you carried out this Alteration?

1.....

2.....

Alteration 4

.....

.....

Very expensive □ Expensive □ Inexpensive □
Very important □ Important □ Unimportant □

Would you please give me two reasons why you carried out this Alteration?

1.....

2.....

Alteration 5

.....

.....

Very expensive □ Expensive □ Inexpensive □
Very important □ Important □ Unimportant □
Would you please give me two reasons why you carried out this Alteration?

1.....

2.....

HA2- Are there any repairs, modifications or maintenance waiting to be done?

Yes □ No □

HA3-Do you think it is important for each house to look different from each other?

Yes □ No □

If yes, why?

.....

.....

HA4- After you have made all the changes to your house that you want to, do you think you will be more satisfied with it, less satisfied, or it have no effect?

More satisfied □ Less satisfied □ No change □

Now I would like to ask you about yourself and your family

DC1. Sex Male □ Female □

DC2. Age

15-24 □ 24-34 □ 35-44 □ 45-54 □ 55- more □

DC3. Social status

[1]- Married [2]-Not married [3]- Divorced [4]- widower

DC4. Education of the head of the family:

None □ koranic □ Primary school □ Middle school □

Secondary school □ University □ Others □

DC5.Occupation.....

DC6. Are you the firs owner of this dwelling?

Yes □ No □

DC7.Members of the family who still live with you?

N.	Relationship to head of the Family	Education	S. status	Occupation	Age
	[1]- Wife [2]- Sun [3]- Daughter [4]- Father [5]-Mother [6]- Relevant	[1]- P. school [2]- M. school [3]- S. school [4]- institute [5]- University [6]- illiterate [7]- Others	[1]- Married [2]-Not married [3]- Divorced [4]- widower		
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					

DC8. Do the family members use.

1- Living room for sleeping? Yes □ No □

2- Guest room for sleeping? Yes □ No □

DC9. Income of the head of the family

Less than 100 □ 101-151 □ 152-200 □ 201-250 □

251-300 □ 301-350 □ 351-400 □ More than 450 □

DC10. Total income of the family

Less than 300 □	301-400 □	401-500 □	501-600 □	601-700□
701-800 □	801-900 □	900-1000 □	More than 1000 □	

At the end of this questionnaire I would like to thank you for your assistance

بسم الله الرحمن الرحيم

استبيان عن التغييرات فى النسكن

موضوع البحث:

تقييم ما بعد الاستخدام: مقارنة بين الاستخدام و التصميم

اخي المواطن:

اختى المواطنة:

يهدف هدا الاستبيان الى دراسة التغيرات بالمسكن الليبي والتي نفدت من قبل السكان المالكين و المتمثلة فى الاضافة للمسكن او تعديل داخلى او اى عمل من شانه ان يؤدى الى تغيير المسكن عن الحالة التصميميه التى نفد عليها. كل دلك لغرض عمل مقارنة بين التصميم الاصلى و ما اصبح عليه المسكن بعد الاستخدام الامر الدى سيساعدنا فى الحصول على نموذج للمسكن الليبي يكون مرنا يلبى كتطلبات الاسرة الليبية اخدا فى الاعتبار تطور تركيبة الاسرة الليبية عبر الزمن و تغير نوعية واسلوب الحياة اليومية.

اسم الباحث: محمد عبدالقادر سالم

عنوان الباحث: جامعة الفاتح كلية الهندسة قسم العمارة والتخطيط العمراني

المشرف: دكتورز فوزى عجام

عنوان المشرف: Hireot Watt University Edinburgh College of Art

استبيان عن التعديلات و الاضافة والتغيير فى المسكن

منطقة اقليم طرابلس

اليوم:..... **المدينة.....**

رقم المسكن:..... **رقم المجاورة :.....**

ارجو الاجابة عن الاسئلة فى الاماكن المحددة لها مع اختيار الاجابة التى تراها مناسبة لك وكتابة الرقم للاجابة فى الخانة المحددة لذلك, مع العلم بان الاسئلة التى سنبدا به تتعلق بالمسكن السابق ومسكنك الحالى.

الجزء ألاول نوعية المسكن	المسكن السابق	المسكن الحالى
س1.نوع المسكن, هل هو؟ **[1]. مسكن منفصل** **[2]. شقة فى عمارة** **[3]. مسكن تحت الارض /تقليدى** **[4]. مسكن دو فناء داخلى** **[5]. مسكن ملاصق لمسكن اخر. واجهة واحدة.** **[6]. مسكن شعبي دو فناء امامى وخلفى** **[7]. اخرى (الرجاء حدد).....**	.....	.....
س2. ملكية المسكن :هل تعود ملكية المسكن الى ؟ **[1]. رب الاسرة** **[2]. احد افراد الاسرة غير رب الاسرة** **[3]. احد الاقارب عم., او خال مثلا** **[4]. مؤجر من قبل القطاع الخاص** **[5]. مؤجر من قبل الدولة** **[6]. جهة اخرى (الرجاء حدد)**		
س3. كيف تم الحصول على المسكن **[1]. شراء من الدولة** **[2]. شراء من افراد** **[3]. إرث** **[4]. إرث مع اخرون** **[5]. بناء بقرض** **[6]. اخرى (الرجاء حدد)**		
س4. كم يبلغ عدد ألحجرات ألمستخدمة بالمسكن , بما فى ذلك ألمطبخ وألحمام ؟		
س5. كم حجرة يتم استخدامها من قبل اسرتك ؟ بما فى ذلك المطبخ والحمام ؟		
س6. مواد سقف المسكن؟ هل هى؟ **[1].** خرسانة مسلحة **[2].** هوردى **[3].** اخرى(الرجاء حدد)		
س7. . مما تتكون اغلب المواد الخاصة بالحوائط فى مسكنك؟ **[1].** تراب **[2].** حجر **[3].** طوب اسمنتى **[4].** بلك قرقارشى **[5].** طوب اجر مفرغ **[6].** اخرى (الرجاء حدد)		

يتبع نوعية المسكن	المسكن السابق		المسكن الحالى	
س8. كم شخص متزوج يسكنون معك بنفس المسكن؟				
س9. كم غرفة معيشة فى المسكن ؟ الرجاء تحديد هل هى؟ [1]. صغيرة [2]. متوسطة [3]. كبيرة	العدد	المساحة	العدد	المساحة
س10. كم عدد حجرات النوم بالمسكن؟ الرجاء تحديد فيما اذ كانت ؟ [1]. صغيرة [2]. متوسطة [3]. كبيرة	العدد	المساحة	العدد	المساحة
س11.كم عدد غرف الاستقبال للرجال بالمسكن ؟ الرجاء تحديدهل هى؟ [1]. صغيرة [2]. متوسطة [3]. كبيرة	العدد	المساحة	العدد	المساحة
س12. كم عدد المطابخ بالمسكن؟ الرجاء تحديد هل هى؟ [1]. صغيرة [2]. متوسط [3]. كبيرة	العدد	المساحة	العدد	المساحة
س13. هل لديك مخزن داخل المسكن؟ الرجاء تحديد هل هو؟ [1]. صغيرة [2]. متوسط [3]. كبيرة	نعم ڤ	لأ ڤ	نعم ڤ	لأ ڤ
س14. هل لديك مساحة كافية فى الفناء الخلفى للمسكن؟ [1]. صغيرة [2]. متوسط [3]. كبيرة	نعمڤ	لأ ڤ	نعم ڤ	لأ ڤ
س15. هل لديك مساحة كافية فى الفناء الامامى للمسكن؟ [1]. صغيرة [2]. متوسط [3]. كبيرة	نعم ڤ	لأ ڤ	نعم ڤ	لأ ڤ
س16.هل لديك جراج سيارة داخل سياج المسكن ؟ [1]. نعم [2]. لأ				
س17. هل تجد مساحة الغرف بمسكنك تسع أثاث بيتك؟ [1]. نعم [2]. لأ				
س18. هل ترى ان مقاسات نوافذ مسكنك؟ [1]. كبيرة [2]. مناسبة [3]. صغيرة				
س19. هل تري ان مقاسات الابواب؟ [1]. كبيرة [2]. مناسبة [3]. صغيرة				
س20. هل تجد بيتك مريح خلال فصل الصيف؟ [1]. نعم [2]. لأ	صيف نهارا	صيف ليلا	صيف نهارا	صيف ليلا
س21. هل تجد بيتك مريح خلال فصل الشتاء؟ [1]. نعم [2]. لأ	شتاء نهارا	شتاء ليلا	شتاء نهارا	شتاء ليلا
س22. ما هى العوامل التى لست مرتاح لها فى بيتك؟ هل هي؟ [1]. قلة عدد الحجرات [2]. شكل المسكن ومظهره بشكل عام [3]. عدم وجود مساحة للعب الاطفال [4]. صغر المساحة للحجرات [5]. عوامل اخرى (الرجاء حدد)				

س23. اذكر ثلاث اشياء تحب ان تجدها فى مسكنك المثالى؟ مع ذكر سببان لكل عنصر؟

1.....

أ.....

ب.....

2.....

أ.....

ب.....

3.....

أ.....

ب.....

والان اريد ان اسالك عن مدى رضاك عن المسكن الحالي, الرجاء وضع العلامة √ فى المكان المناسب لذلك.

أ1. منذ متى تقيم بمسكنك الحالى؟

[1]. اقل من 5 سنوات	□
[2].أكثرمن 5 واقل من 10 سنوات	□
[3]. أكثر من 10 سنوات واقل من 15 سنة	□
[4]. أكثر من 15 سنة	□

أ2. هل تملك مسكن اخر بالاضافة الى هذا؟ نعم □ لا□

أ3. الى اى حد انت راض عن الاعتبارات التالية بمسكنك الحالى؟

	[1] راضي جدا	[2] راضي	[3] لا راض ولا غير راض	[4] غير راض	[5] منزعج جدا
أ4. حجم المسكن	□	□	□	□	□
أ5. الارتفاع الداخلى للمسكن من الارضية حتى السقف	□	□	□	□	□
أ6. مساحة غرفة المعيشة	□	□	□	□	□
أ7. مساحة حجرات النوم	□	□	□	□	□
أ8. مساحة حجرة الضيوف	□	□	□	□	□
أ9. مساحة المطبخ	□	□	□	□	□
أ10. مساحة المدخل	□	□	□	□	□
أ11. مساحة الحمام	□	□	□	□	□

الي اي حد انت راض عن الاعتبارات التالية بمسكنك؟

[1] راضي جدا	[2] راضي	[3] لا راض ولا غير راض	[4] غير راض	[5] منزعج جدا

5 4 3 2 1

12أ. مستوي الخصوصية بحجرات النوم لغرض الاسترخاء عندما يكون افراد الاسرة بالمسكن

13أ. مستوي الخصوصية بغرفة المعيشة لغرض الاسترخاء عندما يكون افراد الاسرة بالمسكن

14أ. مستوي الخصوصية بغرفة المعيشة لغرض الاسترخاء عندما يكون هناك ضيوف بغرفة الاستقبال وافراد الاسرة بالمسكن ايضا.

15أ. كمية الفراغ بغرف النوم لغرض القيام ببعض الاعمال

16أ .كمية الفراغ بغرفة المعيشة لغرض القيام ببعض الاعمال عندما يكون افراد الاسرة بالمسكن

17أ كمية الفراغ بغرفة الاستقبال لغرض القيام ببعض الاعمال عندما يكون افراد الاسرة بالمسكن

18أ مستوي الخصوصية بمسكنك بشكل عام لغرض الاسترخاء عندما يكون افراد الاسرة بالمسكن

19أ كمية الفراغ بمسكنك بشكل عام لغرض القيام ببعض الاعمال عندما يكون افراد الاسرة بالمسكن

20أ كمية الفراغ بالحديقة الخارجية لغرض القيام ببعض الاعمال

توزيغ الفرف بالمسكن وعلاقة بعضها ببعض من الامور التى يهتم بها الكثير من السكان الرجاء وضع علامة[√] فى الخانة التى ترى أنها تتفق و رأيك الشخصي

ب: الى اى حد انت راضى عن الاعتبارات التالية فى مسكنك الحالى؟

[1] جدُ راض	[2] راض	[3] لا راض ولا غير راض	[4] غير راض	[5] منزعج جدا

	1	2	3	4	5
ب1.موقع المدخل الرئيسي و حجرةُ الضيوف	□	□	□	□	□
ب2. موقع المطبخ وحجرة الضيوف	□	□	□	□	□
ب3. موقع المطبخ و حجرة المعيشة	□	□	□	□	□
ب4. موقع غرفةالمعيشة وحجرات النوم	□	□	□	□	□
ب5. موقع المعيشة وغرفة الضيوف	□	□	□	□	□
ب6. موقع المطبخ والفناء الخلفى للمسكن	□	□	□	□	□
ب7. موقع المطبخ وغرفة الحمام	□	□	□	□	□
ب8. موقع غرفة الضيوف ودورة المياه	□	□	□	□	□
ب9. موقع غرف النوم والحمام	□	□	□	□	□
ب10. موقع المطبخ و غرف النوم	□	□	□	□	□

المواد الداخلة فى انشاء او الخدمات فى المسكن على سبيل المثال مفاتيح الكهرباء او المواد ذات العلاقة بالخدمات الصحية متل حنفيات المياه وغيرها بالاضافة الى بعض من العوامل الطبيعية مثل الضوء والتهويةوتوفر المساحات اللازمة للمعدات والاثاث داخل المسكن.من العوامل التى يرى البعض ان لها تاثير على رضا السكن.

ب11.بشكل عام كيف تقيم الاعتبارات التالية ذات العلاقة بمسكنك, هل هى جيده, متوسط, ام سيئة؟

	جيد	متوسط	ضعيف
[1]. الامداد بالكهرباء	[ ]	[ ]	[ ]
[2]. مياه الشرب	[ ]	[ ]	[ ]
[3]. نظام المجارى	[ ]	[ ]	[ ]
[4]. التهوية داخل المسكن	[ ]	[ ]	[ ]
[5]. الاضاءة الطبيعية داخل المسكن	[ ]	[ ]	[ ]
[6]. التركيبات الصحية	[ ]	[ ]	[ ]
[7]. التشطيبات الخارجية للمسكن	[ ]	[ ]	[ ]
[8]. التوصيلات والتركيبات الخاصة بالكهرباء	[ ]	[ ]	[ ]

ب12. هل تجد أية عوائق عند استخدام الثلاجة و الغاز وحوض غسيل الاوانى بالمطبخ ؟ نعم□ لأ □

ب13. هل لذيك دواليب حائط بالمطبخ بما يكفى؟ نعم □ لأ □

ج14. هل جميع النوافذ والابواب في مسكنك تفتح وتقفل بسهولة؟ نعم □ لأ □

ب15. هل هناك فواصل فراغية بين الابواب واماكن تثبيتها وكذلك النوافذ؟ نعم □ لأ□

ألأن أريد أن أسالك عن رضاك ألشخصى عن ألحى الذى تسكن فيه, ألرجاء وضع علامة[√] فى الخانة التى ترى أنها تتفق و رأيك الشخصي.

[1] راضي جدا	[2] راضي	[3] لا راض ولا غير راض	[4] غير راض	[5] منزعج جدا
1	2	3	4	5

د1. الخصوصية من قبل الجيران □ □ □ □ □

د2. مستوى الضجيج بالمنطقة □ □ □ □ □

د3. المستوى العام للاضأة بالمجاورة □ □ □ □ □

د4. المظهر الجمالى العام للمجاورة □ □ □ □ □

د5. القرب من وسائل النقل العام □ □ □ □ □

د6. القرب من المراكز التجارية والاسواق □ □ □ □ □

د7. الالوان الخارجية المستخدمة للمساكن □ □ □ □ □

د8. القرب من المراكز الصحية والعيادات المجمعة □ □ □ □ □

د9. القرب من المدارس و المراكز التعليمية □ □ □ □ □

د10. اعمال النظافة العامة وتجميع القمامة □ □ □ □ □

د11. هل تنصح اصدقاؤك اوأشخاص اخرون بالسكن فى هذه المجاورة؟

نعم انصح بذلك□ محتمل أن أنصح □ لا أنصح بذلك □ لا أعرف □

د12. هل انت راضى عن مواقف السيارات؟

أ – الخاصة بافراد العائلة المقيمين بنفس المسكن نعم □ لا□

ب – مواقف السيارات المخصصة للزوار نعم □ لا□

د11. هل تعرض مسكنك لاى نوع من انواع السطو أو ألسرقة أو ألأقتحام عنوة؟ نعم □ لا□

اريد أن ننتقل الان الى جانب اخر من الاستبيان الا وهو التغييرات والتعديلات والاضافة التى قمت بها فى مسكنك الحالي, سواء كان هذا التغيير داخل المسكن او خارجه.

ت1. هل قمت باى اضافة او تعديل او تغيير بمسكنك الحالى؟ نعم □ لا□

اذا كانت الاجابة بنعم ارجوك اذكر كل تعديل او اضافة قمت بها

البند 1 .....

كما ارجو تحديد هل هو

مكلف جدا □ مكلف □ غير مكلف □

مهم جدا □ مهم □ غير مهم □

أهم الاسباب التى جعلتك تقوم بهذا التغيير او الاضافة

1.....

2.....

البند 2 .....

كما ارجو تحديد هل هو

مكلف جدا □ مكلف □ غير مكلف □

مهم جدا □ مهم □ غير مهم □

أهم الاسباب التى جعلتك تقوم بهذا التغيير او الاضافة

1.....

2.....

البند3 .....

كما ارجو تحديد هل هو

مكلف جدا □ مكلف □ غير مكلف □

مهم جدا □ مهم □ غير مهم □

أهم الاسباب التى جعلتك تقوم بهذا التغيير او الاضافة

1.....

2.....

البند 4 .....

كما ارجو تحديد هل هو

مكلف جدا □ مكلف □ غير مكلف □

مهم جدا □ مهم □ غير مهم □

أهم الاسباب التى جعلتك تقوم بهذا التغيير او الاضافة

1.....

2.....

البند5 .....

كما ارجو تحديد هل هو

مكلف جدا □ مكلف □ غير مكلف □

مهم جدا □ مهم □ غير مهم □

أهم الاسباب التى جعلتك تقوم بهذا التغيير او الاضافة

1.....

.....

2.....

البند 6.....

كما ارجو تحديد هل هو

مكلف جدا □ مكلف □ غير مكلف □

مهم جدا □ مهم □ غير مهم □

اهم الاسباب التى جعلتك تقوم بهدا التعديل

1.....
2.....

ت2. هل هناك اية ترميمات أو تعديلات ستقوم بها فى المستقبل القريب؟ نعم □ لا□

ت3. البعض من السكان يرون ان المساكن يجب ان تختلف فى مظهرها الخارجى؟ أوافق □
لا أوافق□
اذا كانت الاجابة بالموافقة؟ لماذا تري ان المساكن يجب ان تختلف فى مظهرها الخارجى؟
.....
.....
.....
.....

ت4. أيوجد تعديلات قمت بها بمسكنك وكان الغرض منها جعل مسكنك يختلف عن المساكن الاخرى؟
نعم □ لا□
اذا كانت الاجابة بنعم الرجاء ذكر هذه التغييرات
.....
.....
.....

ت5. هل هناك مشكلة معينة تقوم دائما بصيانتها بمسكنك؟ نعم □ لأ □
أرجو ذكر هذه المشكلة.....

ت6. بعد ان قمت باجراء الأضافات والتعديلات التى تريدها,هل تعتقد بانك أكثر رضا عن ذى قبل أو أقل رضا أو انه لا يوجد أى تاثير لهذه التغيرات على رضاك عن المسكن؟
أكثر رضا □ أقل رضا □ لا تاثير □

ت7. عندما ترى الجيران أو الأصدقاء يقومون بعمل الصيانة الدورية للمسكن أو اضافة بعض العناصر هل هذا يجعلك تفكر أن تقوم بهذه الأعمال أيضا ؟
نعم أقوم ببعض الأعمال □ فى بعض الأحيان□ لا تاثير □

ت8. هل ترى ان القيام بأعمال التغييرات أمر سهل القيام به؟ نعم □ لا□

ت9. كيف تمت تغطية التكلفة لهذة الاضافات ؟
[1]. توفير من المرتب □
[2]. قرض عقارى □
[3]. أعانة من الاصدقاء □
[4]. اخرى □

ت10. هل قوانين ولوائح الاسكان تساعد على قيامك باعمال الاضافة والتعديل بمسكنك نعم □
لا□

الان ان لم يكن لديك مانعا اريد ان انتقل الى جانب اخر من المعلومات المتعلقة بك وكذلك افراد اسرتك والتى تعتبر من المعلومات المهمة فى هذا البحث.

د1. الجنس ذكر□ أنثى □

د2. العمر
15- 24 سنة□ 25- 34 سنه □ 35-44 سنة □ 45- 54 سنه □ أكبر من 55 سنة□

د3. الحالة الاجتماعية

أعزب□ متزوج□ أرمل□ مطلق□

د5.المستوى التعليمى لرب الاسرة.

[1]. ابتدائى□ [2].اعدادى□ [3]. ثانوي□ [4]. معهد عالى□

[5]. جامعة□ [5]لايقرأ و لايكتب□ [6].أخرى□

د6. وظيفة رب الاسرة:.....

د7. هل انت الساكن الاول لهذا المسكن منذ انشاؤه؟ نعم □ لا□ لا أعرف□

د8. افراد الاسرة المقيمين بنفس المسكن

ر. م	العلاقة برب الاسرة	المستوى التعليمى	الحالة الاجتماعية	الوظيفة	الدخل	العمر	ملاحظات
	[1].زوجة [2].ابن [3]. ابنه [4].اخ [5].أخت [6].والد [7].والده [8].عم [9].عمه [10]. خال	[1].ابتدائى [2].اعدادى [3].ثانوي [4]. معهد عالى [5].جامعة [5]لايقراولايكتب [6].اخرى	[1].أعزب [2].متزوج [3].أرمل [4].مطلق				
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

د9. هل يقوم افراد الاسرة باستغلال

1. غرفة المعيشة للنوم؟ نعم □ لا□
2. غرفة الاستقبال للنوم؟ نعم □ لا□

د10.الرجاء تحديد ألفئة ألتى يقع فيها مرتب رب الاسرة؟

اقل من 100دينار□ من101الى 200 □ من 201الى 300 □ من 301الى400□ اكثرمن 401□

د11. الرجاء تحديد الفئة التى تضم دخل الاسرة الاجمالى

أقل من 401 □ من 400الى 500 □ من 501الى 600 □ من 601الى 700□ من 701 الى 900□

في ختام هذا الاستبيان لا يسعني الا ان اتقدم لك بجزيل الشكر على وقتك الثمين الذلا خصصته لنا وعلى هذه المعلومات القيمة التى ادليت بها علما بان هذه المعلومات ستستخدم لاغراض اكاديمية بحته.

اسم الباحث:

محمد عبد القادر سالم

العنوان:

جامعة الفاتح كلية الهندسة قسم العمارة والتخطيط العمراني.

المشرف:

د. فوزي عجام

Appendix 2

Card 1

External activity

House number: ..... Neighbourhood:..... City...

Questionnaire:.....date:.....

Item	Activity	Code
Ex1		
EX2		
EX3		
EX4		
EX5		
EX6		
EX6		
EX8		
EX9		
EX10		
EX12		
EX13		
EX14		
EX15		
EX16		
EX17		
EX18		
EX19		

Notes

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External activity card 2

House number:..... Questionnaire:.....

City..... Neighbourhood .....

Date:.....

Code	location	Action					Size			Material
		1	2	3	4	5	S	M	L	
ExS1	F. yard									
ExS2	B. yard									
ExS3	S. yard									
ExS4	Facade.1									
ExS5	Facade.2									
ExS6	Facade.3									
ExS7	Facade.4									
ExS8	Roof									
ExS9	Fence									

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Card 3

Internal alteration

House number: ..... Neighbourhood:..... City..... date:.....

Questionnaire:.....

Item	Activity	Code
En1	Removing wall	
En2	Adding wall	
En3	Modifying wall	
En4	Adding window	
En5	Closing window	
En6	Modifying window	
En7	Closing old door	
En8	Changing position of IN- doors	
En9	Adding new internal door	
En10	Changing sanitary fitting	
En11	Changing floor tile	
En12	Changing electricity fitting	
En13	Repair internal cracks	
En14	Change colour	
En15	Decoration	

Notes

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CARD 4

Internal activity.

House number: ..... Neighbourhood:..... City... Questionnaire:.....Date:.....

Code Ins	Space	Action						Size			Surface			Material
		1	2	3	4	5	6	S	M	L	fl	Wa.	Ce.	
In1	Entrance													
In2	G. room													
In3	L. room													
In4	B.room1													
In5	B. room2													
In6	B.room3													
In7	Kitchen													
In8	Bath													
In9	Toilet													
In10	Store													
In11	Stair													
In12	Veranda													
In13	Corridor													

Notes:.....
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Card 5 Site observation

1.Level of dwelling construction

1-Good □
2-Average □
3-poor □

2. Problems can be observed from outside.

1- Plastering and painting peeling □
2- Water leakage □
3- Crakes in walls □
4-Others.....
.....

3. External spaces surrounding the dwelling.

1- Very well kept □
2- Well kept □
3- Poorly kept □

4. Access to respondent' dwelling

1- From main entrance (municipal street) □
2- Another entrance □
3- Other.....

5. Compared to the physical condition of the surrounding dwellings, the respondent's dwelling is.

1- better □
2- worse □
3- same □

6. Side walk between respondent's dwelling and street

1- Exist □ 2- Does not exist □

7. Characteristics of neighbourhood.

1- Old
2- Transitional
3- Others.....

8. Evaluate the presence of the following:

	Good	Average	Poor
1- Street	□	□	□
2- Paths	□	□	□
3- Street lighting	□	□	□
4- Street noise	□	□	□
5- Street noise	□	□	□
6- Heavy traffic	□	□	□

Card 6

Notes:

Total area:……

F. yard area:……

B. yard area:……

S. Yard area:…….

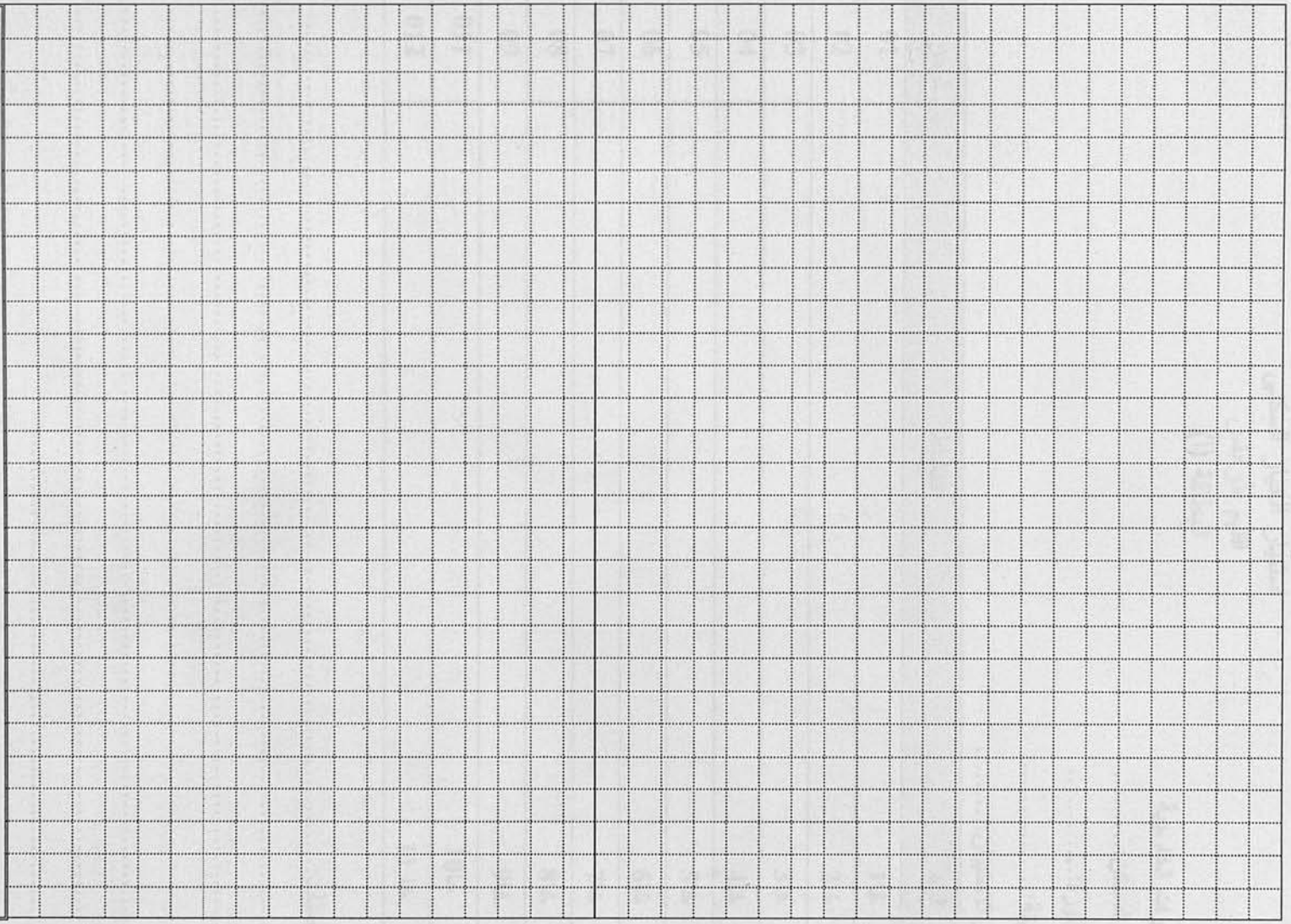
Neighbourhood:…….

City……

Questionnaire:……..

Date:……

House number:……..



استبيان الخيار السكنى
اقليم طرابلس
البطاقة (أ)

التغيرات الخارجية

رقم المسكن:.....

المجاورة:.....

المدينة:.....

رقم الاستبيان:.....

البند	النشاط	الرمز
خا1		01
خا2		02
خا3		03
خا4		04
خا5		05
خا6		06
خا7		07
خا8		08
خا9		09
خا10		011
خا 11		012

ملاحظات:.....

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استبيان الخيار السكنى
اقليم طرابلس
البطاقة (2)

التغيرات الخارجية

رقم المسكن:.....

المجاورة:.....

المدينة:.....

رقم الاستبيان:.....

الرمز	الفراغ	العمل					الحجم			المادة
		1	2	3	4	5	ص	م	ك	
خا1	فناء امامي									
خا2	فناء خلفي									
خا3	فناء جانبي									
خا4	واجهة 1									
خا5	واجهة 2									
خا6	واجهة3									
خا7	واجهة 4									
خا8	السطح									
خا9	السور									

ملاحظات:.....

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استبيان الخيار السكنى
اقليم طرابلس
البطاقة (3)

التغييرات الداخلية:

رقم المسكن:.....

المجاورة:.....

المدينة:.....

رقم الاستبيان:.....

التغييرات الداخلية:

البند	النشاط	الرمز
داخ1		**001**
داخ2		**002**
داخ3		**003**
داخ4		**004**
داخ5		**005**
داخ6		**006**
داخ7		**007**
داخ8		**008**
داخ9		**009**
داخ10		**0011**

ملاحظات:.....

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البطاقة4 : الاعمال الداخلية

رقم المسكن:..... المجاورة:..... المدينة:..... رقم الاستبيان:..... التاريخ:.....

الرمز	الفراغ	النشاط					الحجم			السطح			المادة
		1	2	3	4	5	ص	م	ك	ارضيه	حائط	سقف	
دخ1	مدخل												
دخ 2	غ ضيوف												
دخ3	معيشة												
دخ4	نوم1												
دخ5	نوم2												
دخ6	نوم3												
دخ7	مطبخ												
دخ8	حمام												
دخ9	دورة												
دخ10	مخزن												
دخ11	ممر												
دخ12	بلكونة												

ملاحظات:.....

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البطاقة رقم 5

المجاورة السكنية

1 مستوي تنفيد المنازل بالمجاورة

[1] جيد □
[2] مقبول □
[3] ضعيف □

2 المشاكل التي يمكن ان تلاحظ من خارج المسكن

[1] مشاكل سقوط اللياسة و الطلاء □
[2] مشاكل تسرب مياه الامطار □
□[3] مشاكل شروخ بالحوائط □
[4]] مشاكل اخري .....
.....
.....

3 الفضاءات التي حول مسكن الحالة الدراسية

[1] مرتبة بشكل جيد جدا □
[2] مرتبة بشكل جيد
[3] غير مرتبة وتحتاج الي اصلاحات ثانوية □
[4] وضع سيئ وتحتاج الي اصلاحات رئيسية □

4 الدخول الى مسكن الحالة المدروسة

[1] مباشرة من الطريق العمومى □
[2] عبر تجاوز مسكن اخر عن طريق ممر مشاة ف
[3] اخري .....
.....

5 مقارنة بالمساكن الاخرى يعتبر مسكن الحالة

[1] احسن □
[2] اسواء □
[3] متوسط □

6 حالة الارصفة فى المجاورة

[1] موجوده □
[2] غير موجوده □

7 عمر وحالة المجاوره

[1] قديمة □
[2] يبدو عليها طابع التغير □
[3] جديدة □

8 تقييم جودة العوامل التالية

	جيد	معقول	سيئ
[1] الطرق	[ ]	[ ]	[ ]
21] الارصفة	[ ]	[ ]	[ ]
[3] اضاءة الشوارع	[ ]	[ ]	[ ]
[4] القمامة	[ ]	[ ]	[ ]
[5] الضجيج	[ ]	[ ]	[ ]
[6] المرور	[ ]	[ ]	[ ]

ملاحظات

المساحة :المتر المربع

..... م^2

مساحة الفناء الامامى

..... م^2

مساحة الفناءالخلفى

..... م^2

مساحة الفناء الجانبى

..... م^2

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رقم الاستبيان.....

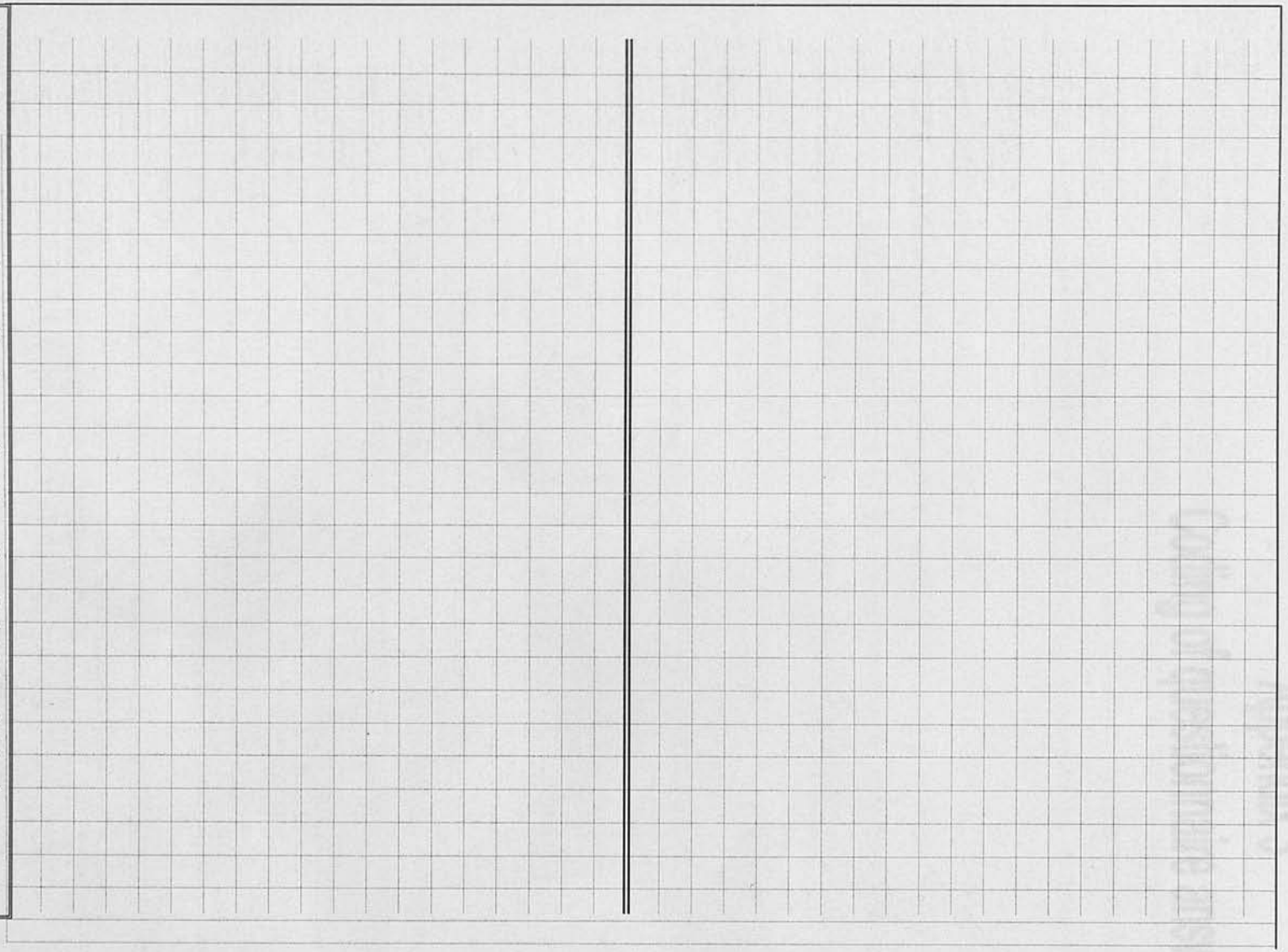
المدينة:.....

المجاورة:.....

رقم البطاقة:.....

التاريخ:.....

مقياس الرسم:.....



Appendix 3
Coding of questionnaire answers

Introduction

In order to enter the data collected in the fieldwork into the computer for statistical analysis, the data were reduced to a numerical format and questions were coded. A separate coding was given to each question identified in this research questionnaire. The question code includes 8 parts. Generally, the first two digits indicate the main section of the questionnaire, followed by a digit indicating a sub-section, as shown in the following tables.

The questionnaire was divided into five main sections: housing attributes (HA), housing satisfaction (HS), neighbourhood quality (NQ), and alterations (ALT) ,keeping in mind that not all the questions of the alterations section considered in statistical analysis as well as the ideal home section where different techniques used for analysis, and demographic characteristics (DC).

Housing attributes

The 22 questions in this section are mostly oriented to the housing attributes. The code used for this section consists of eight digits organised as shown in table 1.

Section	Question number	Previous house	Current house	Question description
HA	1	P	C	

Table -1 Coding of housing attributes

Table 2 is divided into four columns, the last two columns include the coding of

HA	Housing Attributes	Abbreviation previous	Abbreviation current
1	What is (was) the TYPE of the dwelling unit?	HA1PTYPE	-
2	Who is (was) the OWNer of the dwelling unit?	HA2POWN	HA1COWN
3	How did the HOuse come into your POssession?	HA3PHOPO	HA1CHOPO
4	What is (was) the total Numbers of ROoMs in the dwelling?	HA4PNROM	HA1CNROM
5	How many separate ROoms does (did) the household OCcupy?	HA5PROOC	HA5CROOC
6	What MAterial is (was) the ROof mostly made of?	HA6PMARO	HA6CMARO
7	What MAterial are (were) the WAlls mostly made of?	HA7PMAWA	HA7CMAWA
8	How many married persons share (d) the house?	HA8PMARP	HA8CMARP
9	How many LIVing Rooms are (were) in the dwelling unit?	HA9PLIVR	HA9CLIVR
10	How many BeD Rooms are (were) in the dwelling unit?.	HA10PBDR	HA10CBDR
11	How many GEest Rooms are (were) in your house?	HA11PGUR	HA11CGUR
12	How many KITchens are (were) in the dwelling unit?	HA12PKIT	HA12CKIT
13	Do (did) you have a STOrage inside your house?	HA13PSTO	HA13CSTO
14	Do (did) you have enough SPAce in the Back Yard of the house?	HA14PSBY	HA14CSBY

Table -2 Housing attributes coding

HA	Housing Attributes	Abbreviation previous	Abbreviation current
15	Do (did) you have enough Space in the Front Yard of the house?	**HA15PSFY**	**HA15CSFY**
16	Do (did) you have a GARage inside the fence of your house?	**HA16PGAR**	**HA16CGAR**
17	Do (did) you find internal Space of your house suits your FUrniture?	**HA17PSFU**	**HA17CSFU**
18	How about the Size of your WIndows?	**HA18PSWI**	**HA18CSWI**
19	How about the Size of your DOors?	**HA19PSDO**	**HA19CSDO**
20	Do you find your house CoMfortable during Summer?	**HA20PCMS**	**HA20CCMS**
21	Do you find your house CoMfortable during Winter?	**HA21PCMW**	**HA21CCMW**

Table -2 Housing attributes coding

questions for previous and current dwellings.

Housing satisfaction code

The second section of the questionnaire includes three sub-sections with a total of 30 questions, coded as follows. The first two digits were given to the main section, the third one for the sub-section, then digits signifying the question number, followed by question description, as indicated in Table 3.

Section	Sub-section	Question number	Question description
HS	A	1	

Table-3 Code of housing satisfaction sub-section-A

HS	Housing satisfaction section-A	Abbreviation
1	Would you please tell me when did you MOVE to this house?	HSA1MOVE
2	Do you OWn ANother House?	HSA2OWAH
3	How satisfied are you with	********
4	SIZE of your house	HSA4SIZE
5	Floor to ceiling HEIGht	HSA5HEIG
6	Space of the BEDroom	HSA6SBED
7	Space of the GueST room	HSA7SGST
8	Space of the KITchen	HSA8SKIT
9	Space of the ENTrance	HSA9SENT
10	Space of the baThroom	HSA10SBT
11	CIRCulation within your house	HSA11CIR

Table 4 Housing satisfaction sub-section B

Satisfaction with privacy and amount of space (B)

In this sub section ten questions were introduced, coded similarly to the previous section related to satisfaction as shown in Table5 and Table 6.

Section	Sub section	Question number	Question description
HS	B	1	

Table 5 dwelling satisfaction coding

HS	Housing satisfaction	Abbreviation
B1	Level of Privacy in your Bedroom for Relaxing when other Occupants are also at home?	HSB1PBRO
B2	Level of Privacy in the Living room for Relaxing when the other Occupants are also at home?	HSB2PLRO
B3	Level of Privacy in the Living room for Relaxing when you have Visitors in the guest room and other Occupants are also at home	SB3PLRVO
B4	Amount of Space in the Living room for doing tasks when the other Occupants are also at home	HSB4ASLO
B5	Level of Privacy in the Guest room for Relaxing when the other occupants are also at home	HSB5PGRO
B6	Amount of Space in the bedroom for Relaxing when the other occupant are also in the home	SB6ASBRO
B7	Amount of Space in the Living room for Relaxing when the other occupants are also in the home	HSB7ASLO
B8	Amount of Space in the Guest room for doing tasks when the other Occupants are also in the home	HSB8ASGO
B9	Amount of the Space in your Home as a Whole for relaxing when the other occupants are at home	HSB9ASHW
B10	Level of Privacy in your Home as a Whole When the other occupants are also at home	HSB10PHW

Table-6 satisfaction with privacy and amount of space code

Satisfaction with position of living space (C)

In this sub-section, 14 questions were introduced, coded similarly to the previous section related to satisfaction. These are shown in Table 7 and Table 8.

Section	Sub-section	Question number	Question description
HS	C	6	

Table 7 Satisfaction section C code

HS	Housing satisfaction	abbreviation
C1	Position of the Entrance to the Living room	HSC1PEL
C2.	Position of the Entrance to the Guest room	HSC2PEG
C3	Position of the Kitchen to the Living room	HSC3PKL
C4	Position of the Living room to the Bedroom	HSC4PLB
C5	Position of the Kitchen to the guest room	HSC5PKG
C6	Position of the Kitchen to the bathroom	HSC6PKBH
C7	Position of the Kitchen to BacK yard	HSC7PKBK
C8	Position of the Bathroom to the Guest room	HSC8PBHG
C9	Position of the Bathroom to the BEdrooms	HSC9PBBE

Table 8 Satisfaction with position code

Satisfaction with services within the house

In this sub-section which regards satisfaction with the services within the house all the questions are considered under satisfaction criteria and coded similarly to those in sub-section B, as shown in Table 9.

HS	Services within the house	Abbreviation
S10	1 Electricity supply	HSS1ELEC
	2 Domestic water	HSS2WATR
	3 Recreation facilities	HSS3RECE
	4 Public transportation	HSS4TRAN
	5 Sewage system	HSS5SEWA
	6 Street lighting	HSS6LIGH
	7 Ventilation inside dwelling	HSS7VENT
	8 External building finishes	HSS8FINI
S11	Are the refrigerator, stove and sink situated in a way that they can be used without difficulty?	HSS11RSS
S12	Do you have enough cupboard space in the kitchen?	HSS12ECS
S13	Do all windows and doors open and close properly?	HSS13WDP
S14	Are there any gaps to outside (e.g. under doors, or around windows)?	HSS14AGP

Table 9 Satisfaction with services code

Neighbourhood quality

In this sub-section ten questions were introduced, coded similar to the previous section related to satisfaction as shown in Table 10 and Table 11.

Main section	Sub-section	Question number	Question description
NQ	SN	1	

Table 10 Neighbourhood satisfaction code

NQ	Neighbourhood quality	Abbreviation
NQ1	PRIVacy from Neighbour	NQ1PRIVN
NQ2	The NOISE level in the area	NQ2NOISE
NQ3	LIGHTing level of public area	NQ3LIGHT
NQ4.	General APPEaRance of the neighbourhood	NQ4APPER
NQ5.	EXternal COLours used for houses	NQ5EXCOL
NQ6.	Proximity to transportation	NQ6 TRANS
NQ7	PROximity to store or MArket	NQ7PROMA
NQ8	Nearness to HEaLth facilities	NQ8NEHEL
NQ9	NEarness to EDUcational facilities	NQ9NEEDU
NQ10	Adequacy of REFuse Disposal facilities	NQ10REFD
NQ11	How likely would you be to RECommend this place to someone you know as a place to Live?	NQ11RECL
NQ12	Are you satisfied with Parking FACilities?	NQ12PFAC
NQ13	Has your home ever been broken into or BURGled?	NQ13BURG

Table 11 Neighbourhood questions' code

Alterations codes

In this section, four questions were coded similar to the previous sections related to satisfaction as shown in Table 12.

Alt	Alteration	Abbreviation
1	Have you , modified your house?	Alt1
2	Are there any repairs, modifications or maintenance waiting to be done?	Alt2
3	Do you think it is important for the house to look different from each other?	Alt3
4	Are there any changes you have made to this house to make it look different from other houses around here?	Alt4

Table 12 Alteration questions' code

Demographic characteristics

The last section in the questionnaire was related to demographic characteristics. The same coding was given to the questions entered into the computer as shown in Table 13.

DC	demographic characteristics	Abbreviation
1	Sex	DCSEX
2	Age	DCAGE
3	Social status	DCSOCIAL
4	Education	DCEDUCA
5	Occupation	DCOCCUP
6	First owner of the house	DCFIROW
7	Members of the family which they still live with you	DCMEFLIW
8	Does the family members use. A- Living room for sleeping	DCASLIV
	B- Guest room for sleeping?	DCBSGUE

Table 13 demographic characteristic codes

Appendix 4
Tables and Figures

HA8CMARC	Freq.	Perc.
No one	27	54.0
One person	19	38.0
Two people	4	8.0
Total	50	100.0

Table 6.1 Married people in current house

HA8CMARP	Freq	Perc
No one	25	50.0
One person	7	14.0
Two	17	34.0
3 people	1	2.0
Total	50	100.0

Table 6 .2 Married people in previous house

HA1PTYPE	respondents	Perc.
Single detached house	10	20.0
Underground house	3	2.0
Flat	6	12.0
Courtyard house	18	36.0
Single attached house	12	24.0
No answer	1	2.0
Total	50	100.0

Table 6.3 Previous house type

HA2POWN	Freq.	Perc.
Head of the family	14	28.0
Member of household	7	14.0
Private landlord	24	48.0
Rented from government	4	8.0
No answer	1	2.0
Total	50	100.0

Table 6.4 Owner of the previous house

HA3PHPO	Freq.	Perc.
From state	5	10.0
From individual	9	18.0
Inherited	6	12.0
Inherited with others	2	4.0
Built	13	26.0
Other	4	8.0
No answer	11	22.0
Total	50	100.0

Table 6.5 Ownership status of previous house

3 HA5PROOC	Freq.	Perc.
3 rooms	2	4.0
4 rooms	8	16.0
5 rooms	17	34.0
6 rooms	17	34.0
7 rooms	4	8.0
No answer	2	4.0
Total	50	100.0

Table 6.6 spaces used in previous house

HA4CNROM	Freq.	Perc.
8 rooms	26	52.0
9 rooms	2	4.0
10 rooms	6	12.0
12 rooms	4	8.0
14 rooms	3	6.0
16 rooms	9	18.0
Total	50	100.0

Table 6.7 Number of spaces in current house

HA4PNROM	Freq	Perc.
3 rooms	4	8.0
4 rooms	16	32.0
5 rooms	14	28.0
6 rooms	10	20.0
7 rooms	2	4.0
No answer	4	8.0
Total	50	100.0

Table 6.8 Room used in previous house

HA15CSFY	Freq.	Perc.
No answer	2	4.0
Small	5	10.0
Medium	16	32.0
Large	27	54.0
Total	50	100.0

Table 6.9 Area of the front yard current house

HA14CSBY	Freq.	Perc.
Small	3	6.0
Medium	12	24.0
Large	30	60.0
No answer	5	10.0
Total	50	100.0

Table 6.10 Area of the back yard area in current house

HA10PBDR	Freq.	Perc.
One bedroom	5	10.0
Tow bedrooms	14	28.0
Three bedrooms	23	46.0
Four bedrooms	2	4.0
Five bedrooms	2	4.0
Six bedrooms	1	2.0
No answer	3	6.0
Total	50	100.0

Table 6.11 Number of Bedrooms in previous house

HA10PBDR	Freq	Perc.
Small	29	58.0
Medium	19	38.0
Large	1	2.0
No answer	1	2.0
Total	50	100.0

Table 6.12 Area of bedrooms in previous house

HA10CBDR	Freq.	Perc.
Three rooms	27	54.0
Four rooms	2	4.0
Five rooms	6	12.0
Six rooms	13	26.0
Seven rooms	2	4.0
Total	50	100.0

Table 6.13 Number of bedrooms in current house

HA10CBDR	Freq.	Perc.
Small	11	22.0
Medium	27	54.0
Large	11	22.0
No answer	1	2.0
Total	50	100.0

6.14 Area of bedrooms in current house

HA9PLIVR	Freq.	Perc.
1 Living room	41	82.0
2 Living rooms	1	2.0
No answer	8	16.0
Total	50	100.0

Table 6.15 L room in previous house

HA9PLIVR	Freq.	Perc.
small	27	54.0
Medium	15	30.0
No answer	8	16.0
Total	50	100.0

Table 6.16 Area living room in previous house

HA9CLIVR	Freq.	Perc.
1 living room	40	80.0
2 living room	9	18.0
No answer	1	2.0
Total	50	100.0

Table 6.17 number of living rooms in current house

HA9CLIVR	Freq.	Perc.
Small	19	38.0
Medium	21	42.0
Large	8	16.0
No answer	2	4.0
Total	50	100.0

Table 6.18 Area of living rooms in current house

HA11PGUR	Freq.	Perc.
One guest rooms	43	86.0
Two guest rooms	1	2.0
No answer	6	12.0
Total	50	100.0

Table 6.19 Number of guest rooms in previous house

HA11PGUR	Freq.	Perc.
Small	41	82.0
Medium	4	8.0
No answer	5	10.0
Total	50	100.0

Table 6.20 Area of guest room in previous house

HA11CGUR	Freq.	Perc.
One guest room	40	80.0
Two guest rooms	9	18.0
No answer	1	2.0
Total	50	100.0

Table 6.21 Number of guest rooms in current house

HA11CGUR	Freq.	Perc.
Small	23	46.0
Medium	16	32.0
Large	9	18.0
No answer	2	4.0
Total	50	100.0

Table 6.22 Area of guest room in current house

HA17CSFU	Freq.	Perc.
Yes	45	90.0
No	5	10.0
Total	50	100.0

Table 6.23 Suitability of furniture in current rooms

HA17PSFU	Freq.	Perc.
Yes	6	12.0
No	43	86.0
No answer	1	2.0
Total	50	100.0

Table 6.24 Suitability furniture in previous rooms

HA20PCMD	Freq.	Perc.
Yes	30	60.0
No	20	40.0
Total	50	100.0

Table 6.25 Comfort during summer day in previous house

HA20PCMN	Freq	Perc.
Yes	28	56.0
No	22	36.0
Total	50	100.0

Table 6.26 Comfort during summer night in previous house

HA20CCMD	Freq.	Perc.
Yes	16	32.0
No	34	68.0
Total	50	100.0

Table 6.27 Comfortable during summer day in current house

HA20CCMN	Freq	Perc.
Yes	23	46.0
No	27	54.0
Total	50	100.0

Table 6.28 Comfort during summer night in current house

HA21PCWD	Freq	Perc
Yes	40	80.0
No	10	20.0
Total	50	100.0

Table 6.29 Comfortable during winter day in previous house

HA21PCWN	Freq	Perc
Yes	32	64.0
No	18	36.0
Total	50	100.0

Table 6.30 Comfortable during winter night in previous house

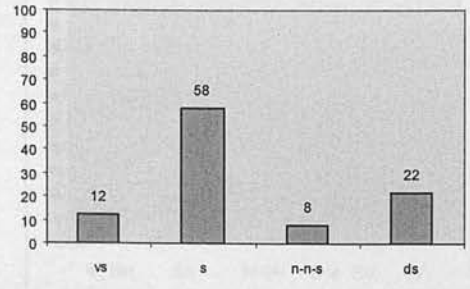
HA21CCWD	Freq	Perc
Yes	21	42.0
No	29	58.0
Total	50	100.0

Table 6.30 Comfortable during winter day in current house

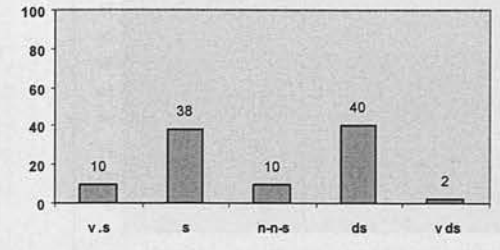
HA21CCWD	Freq	Perc
Yes	15	30.0
No	35	70.0
Total	50	100.0

Table 6.31 Comfortable during winter night in current house

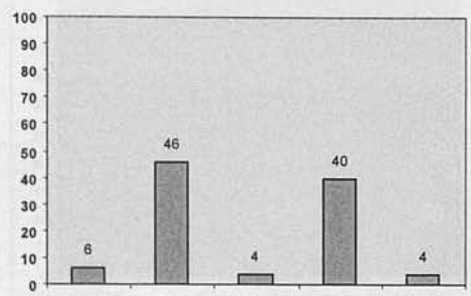
1 satisfactio with size of the house



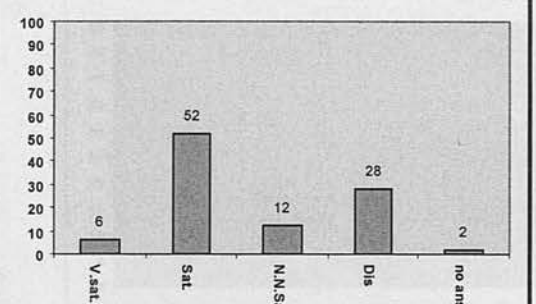
2 satisfaction with internal hight of the house



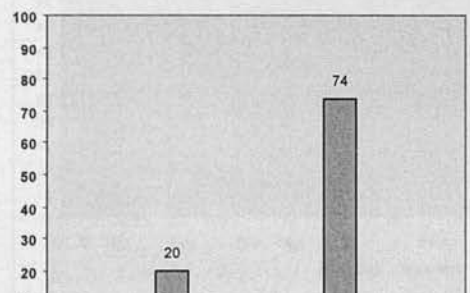
3 satisfaction with l.room area



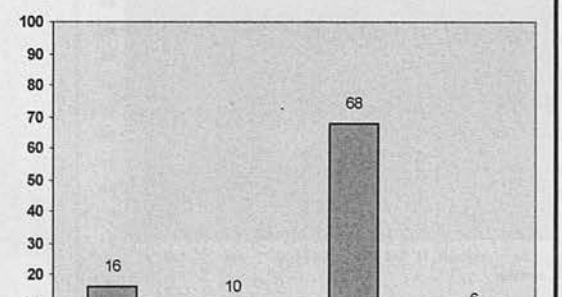
4 satisfaction with b.room area



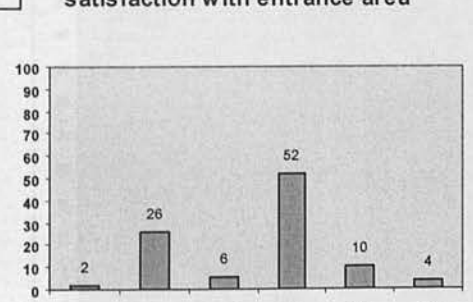
5 satisfaction with G.room area



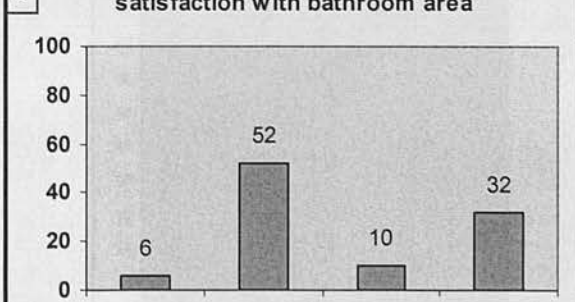
6 satisfaction with K.area



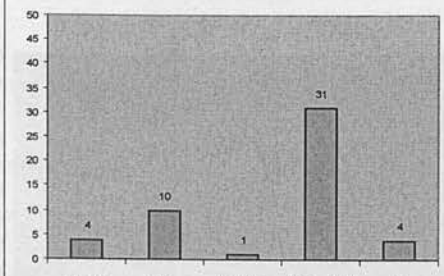
7 satisfaction with entrance area



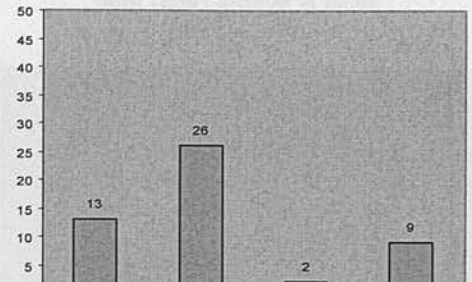
8 satisfaction with bathroom area



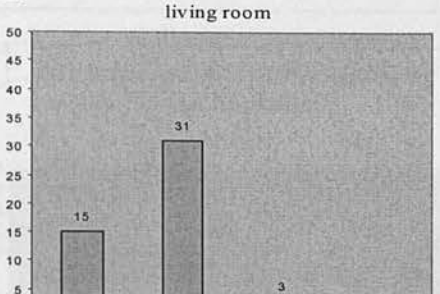
9 Satisfaction with position of entrance to the guest room



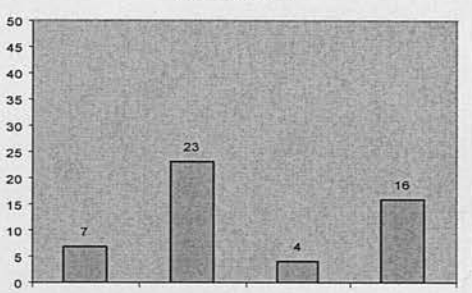
10 Satisfaction with position of the kitchen to the guest room



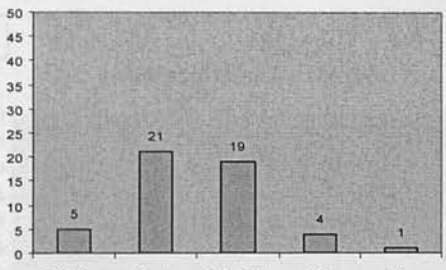
11 Satisfaction with position of kitchen to living room



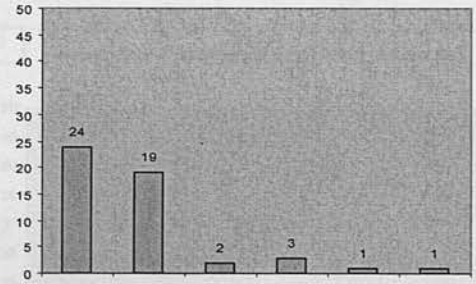
12 Satisfaction with position of living room to bed room



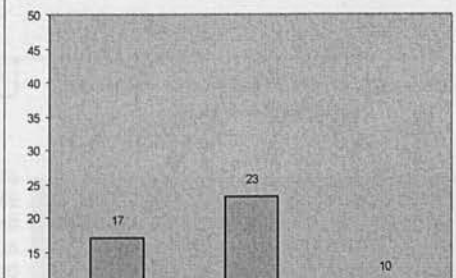
13 Satisfaction with the position of living room to guest room



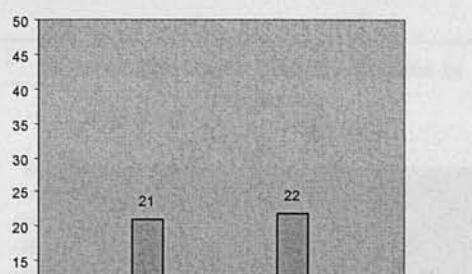
14 Satisfaction with position of the kitche to back yard



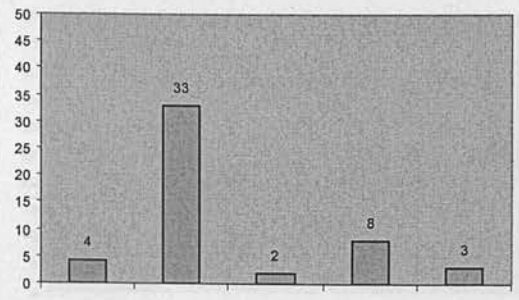
15 Satisfaction with position of the kitchen to the bath room



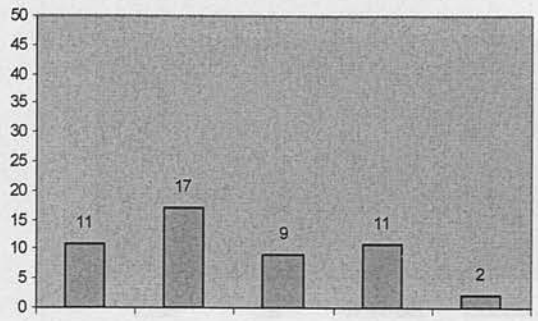
16 Satisfaction with position of bed room to bath room



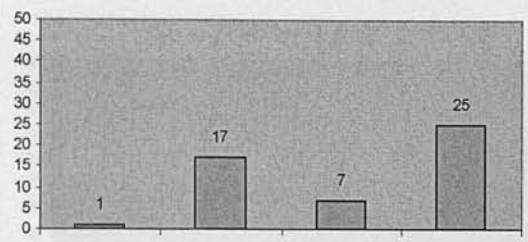
17 Satisfaction with position ofkitchen to bed room



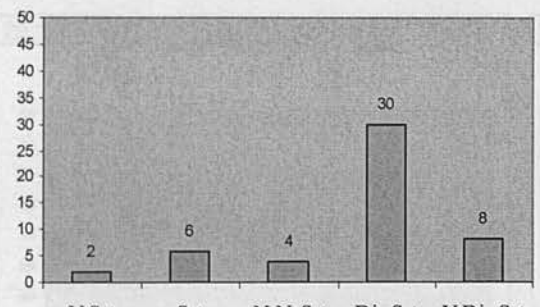
18 Satisfaction with level of privacy in bed room when family member at home



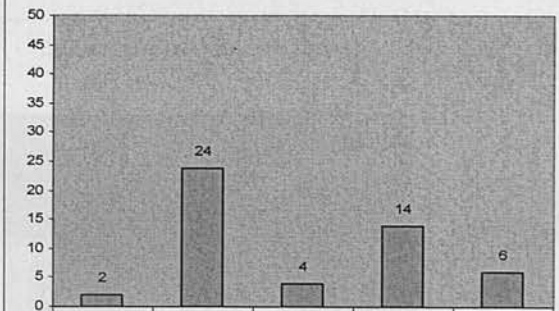
19 Satisfaction with level of privacy in living room for relaxing



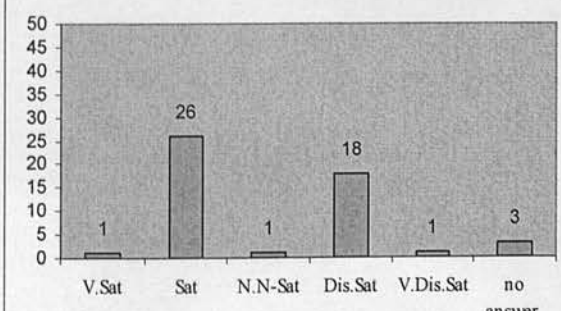
20 Satisfaction with level of privacy in living room when there are visitores



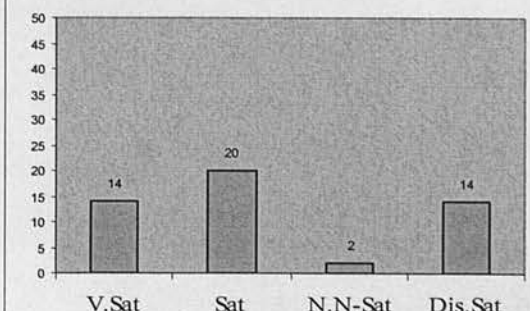
21 Satisfaction with level of privacy in general



22 Satisfaction with amount of space in general when family member at home

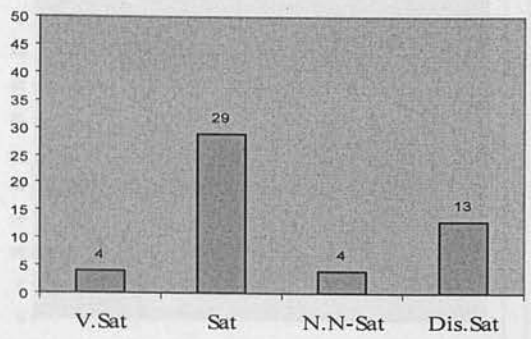


23 Satisfaction with amount of space in the garden



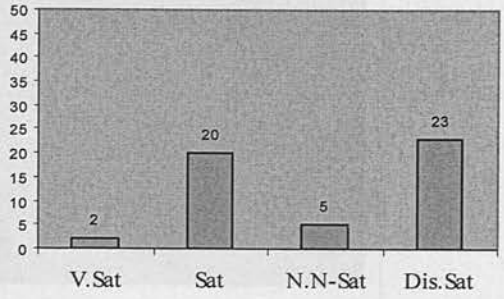
24

Satisfaction with amount of space in bed rooms for doing activity



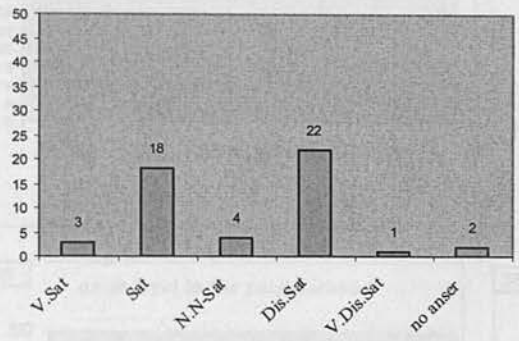
25

Satisfaction with amount of space in living room for activity when family member at home



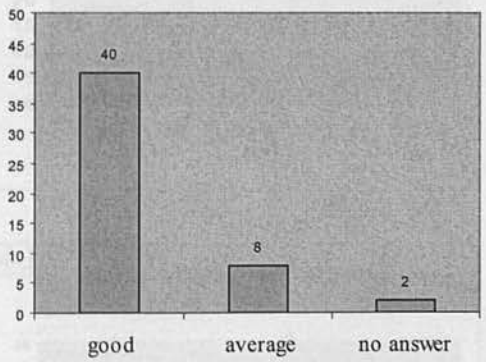
26

Satisfaction with amount of space in guest room for activity when family member at home



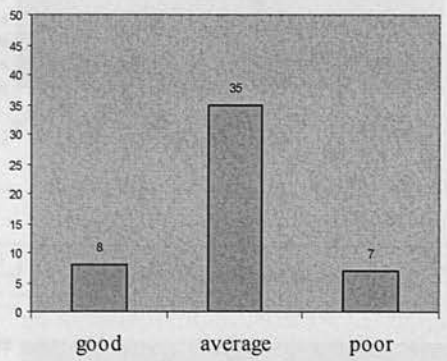
29

Evaluation of the natural light



30

Evaluation of the sanitary fitting



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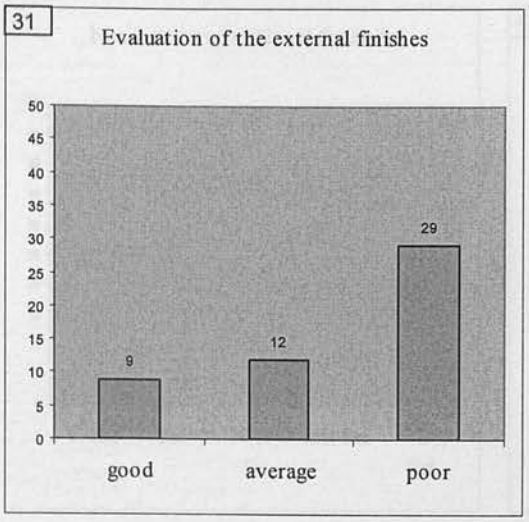

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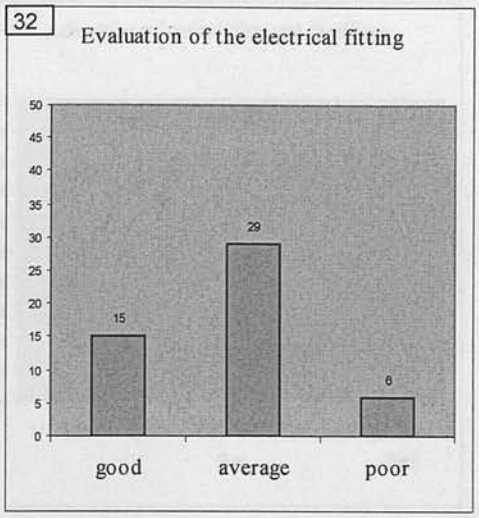

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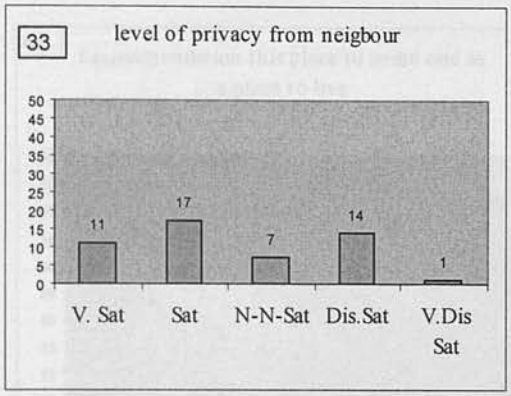

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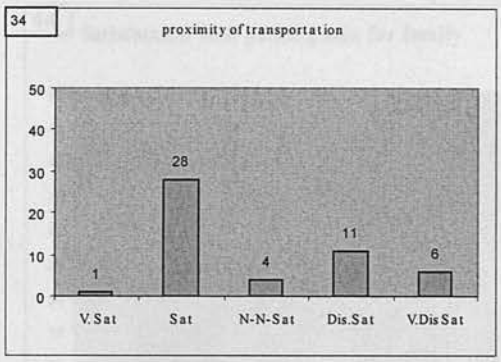

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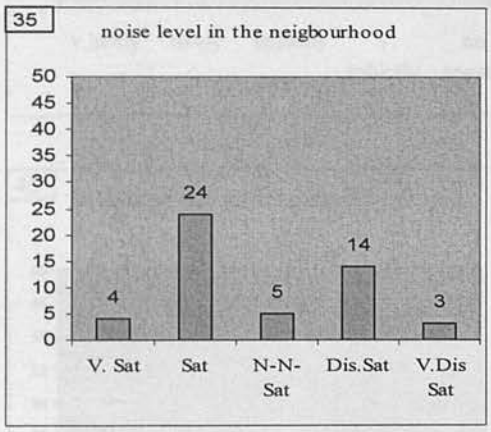

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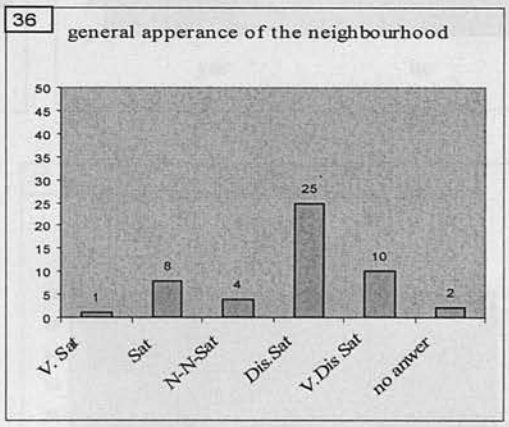

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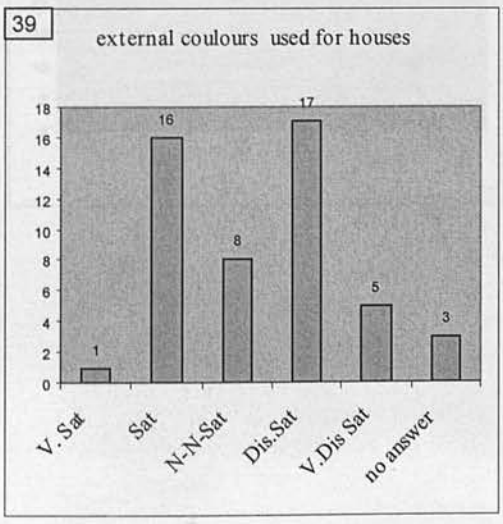

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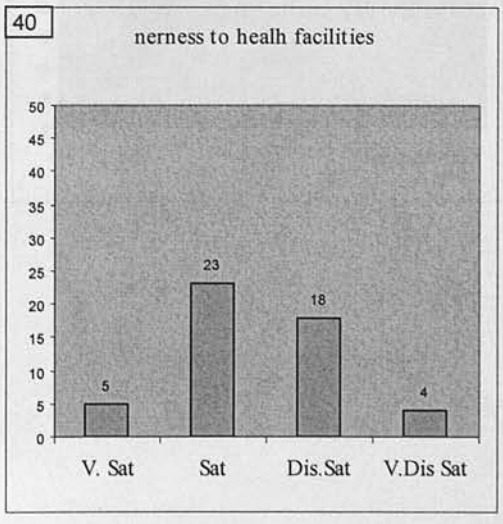
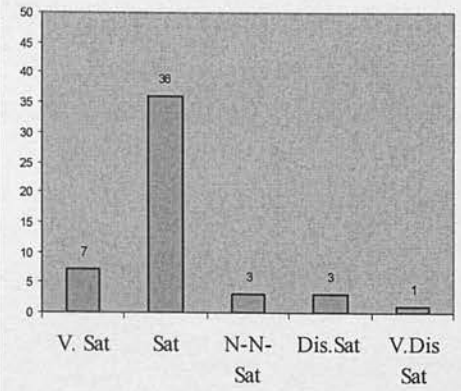
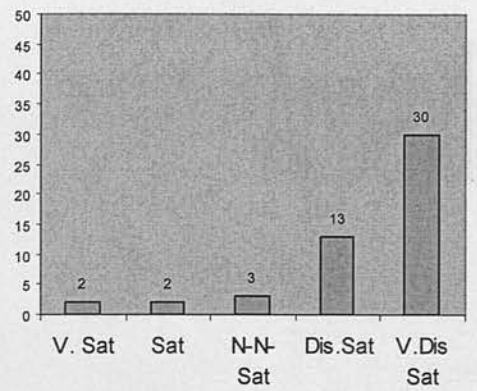


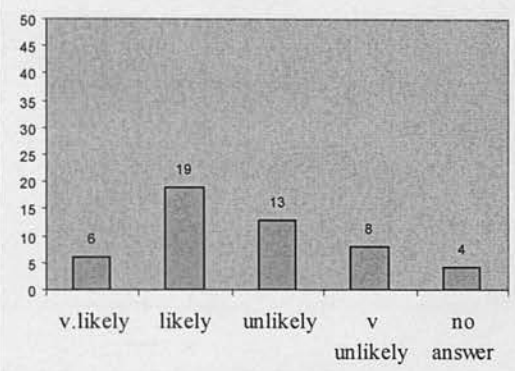
41 Nearness to educational facilities



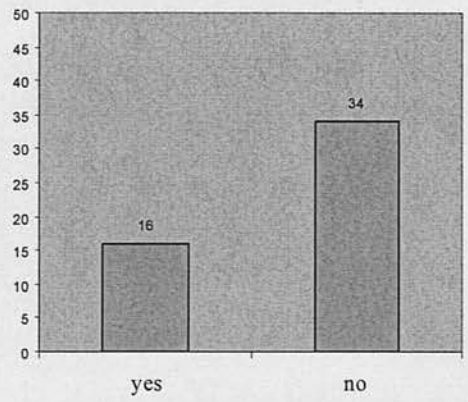
42 Adequacy of refuse disposal facilities



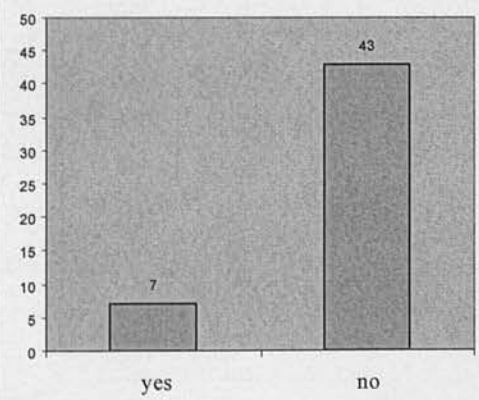
43 Recommendation this place to some one as a place to live



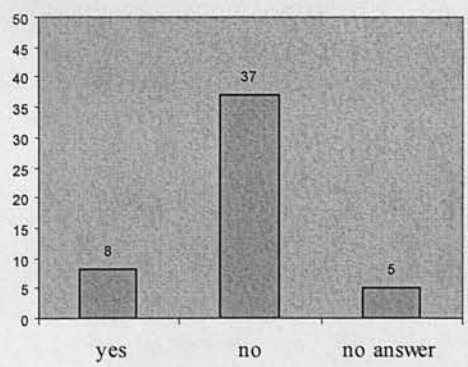
44 Satisfaction with parking area for family



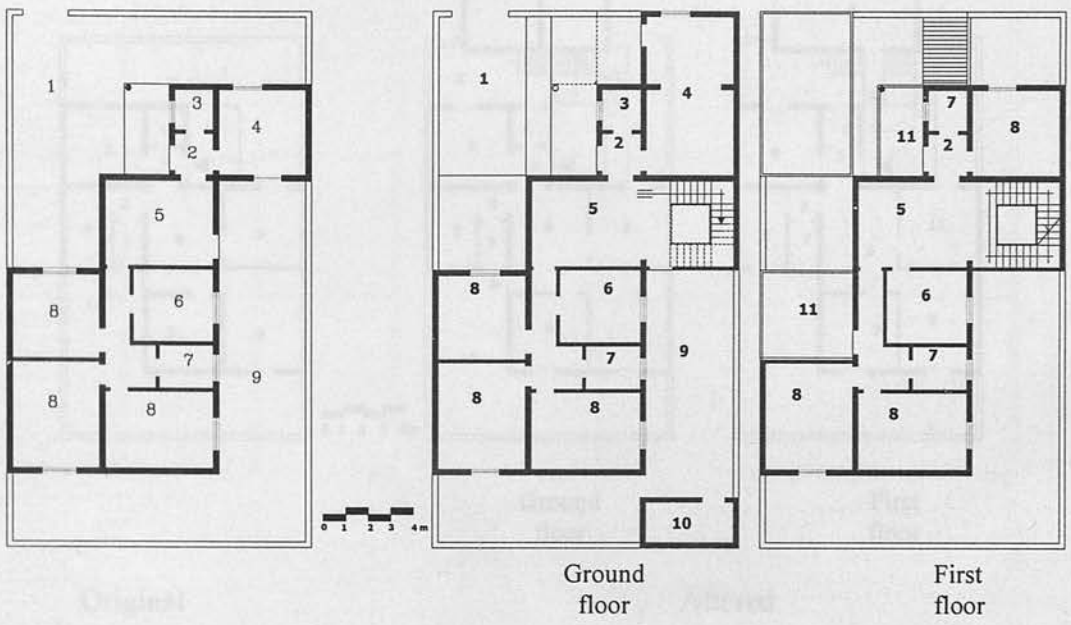
45 Satifaction with parking area for visitors



46 Has your home ever been broken into or burgled



Appendix 5

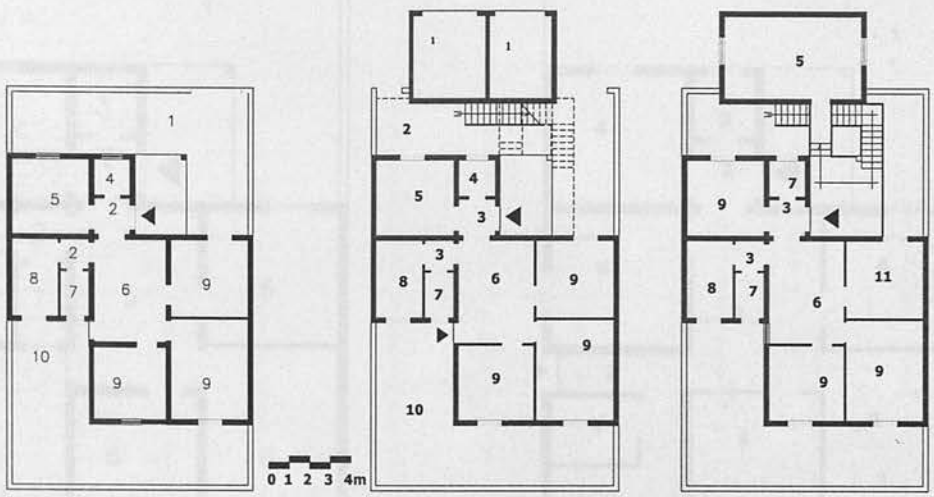


1= Entrance 2= Lobby 3= Toilet 4= Guest room 5= Living room
6= Kitchen 7= Bath room 8= Bedroom 9= Back yard 10= store
11=Balcony

Figure1
Dwelling type: B

Types of alterations:

- In the ground floor plane new complete roofed staircase in the back yard
- New flat added on the roof.
- New space was added to the guest room.
- New gust toilet was added in the firs floor
- Total area added to the original dwelling is 190 m²



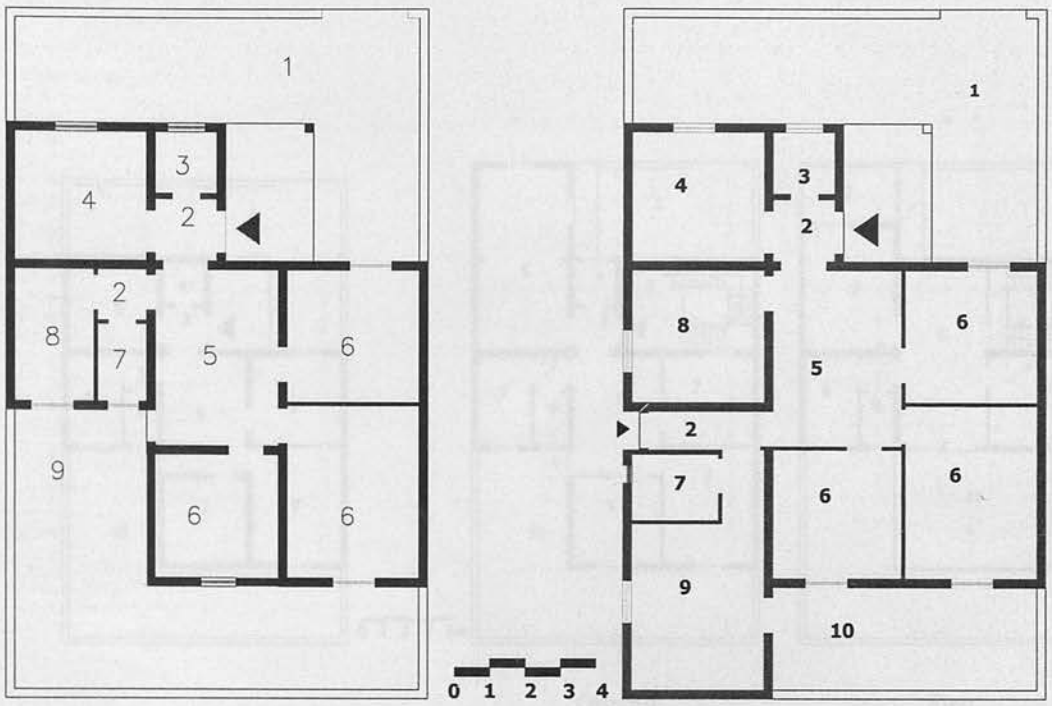
1= Shop 2= Front yard 3= lobby 4= Toilt 5= Guest room
6= Living room 7= bath room 8= Kitchen 9= bedroom
10 = back Yrd 11= study room

Figure2

Dwelling type: A

Type of changes:

- Two shops were constructed in the front yard on additional area added to the original area.
- New staircase without ceiling was added in the front yard
- Adding new flat on the roof as design of the ground floor plan
- Shops roof was used as a guest room
- No changes in the backyard except soft landscape



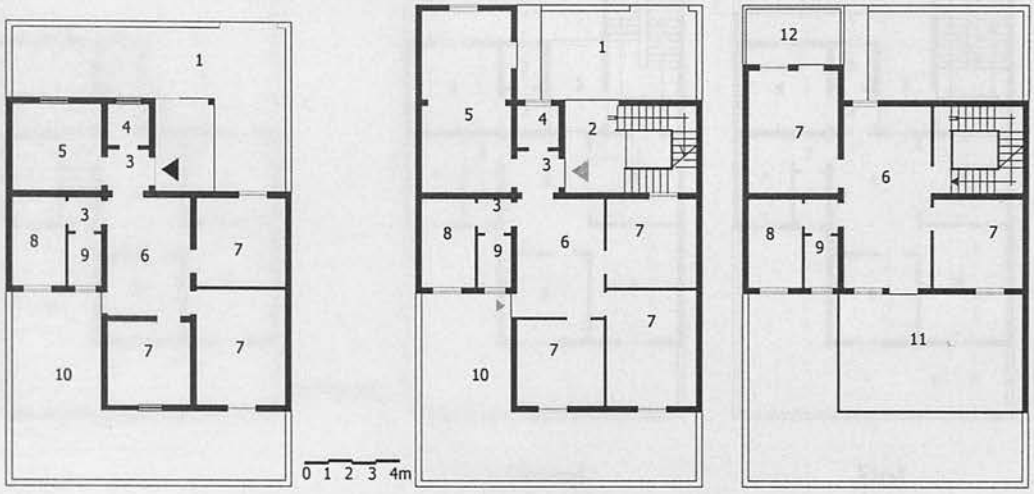
1= Front yard	2= Entraance lobby	3= Toilet	4= Guest room	5= Living room
6= Bedroom	7= Bath room	8= Kitchen	9= Female room	10= Bach yard

Figure 3

Dwelling type: A

Type of changes:

- New entrance was added as a second access to the house
- Converting the internal space by removing the bath room to the kitchen and converting this space to a setting room for female guest room
- Converting bed room to two functional spaces one used as a kitchen and the other used as a bath room after adding external space to it
- Adding external store.
- Modifying the parapet
- Soft landscape was added in the front yard



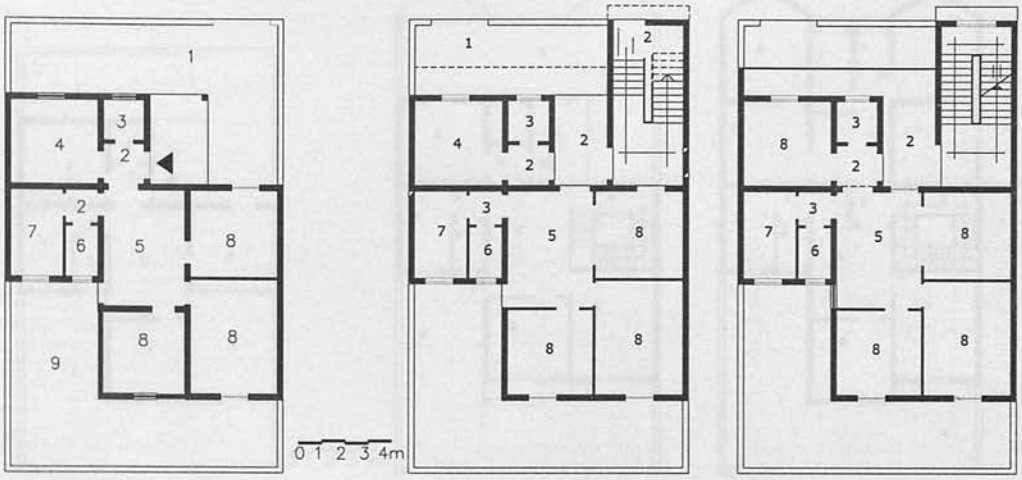
1= Front yard	2= Entrance	3= Lobby	4= Toilet	5= Guest room
6= Living room	7= Bedroom	8= Kitchen	9= Bath room	10= Back yard
11= Balcony				

Figure4

Dwelling type: A

Type of changes:

- Adding staircase in the front yard
- Adding new flat on the roof



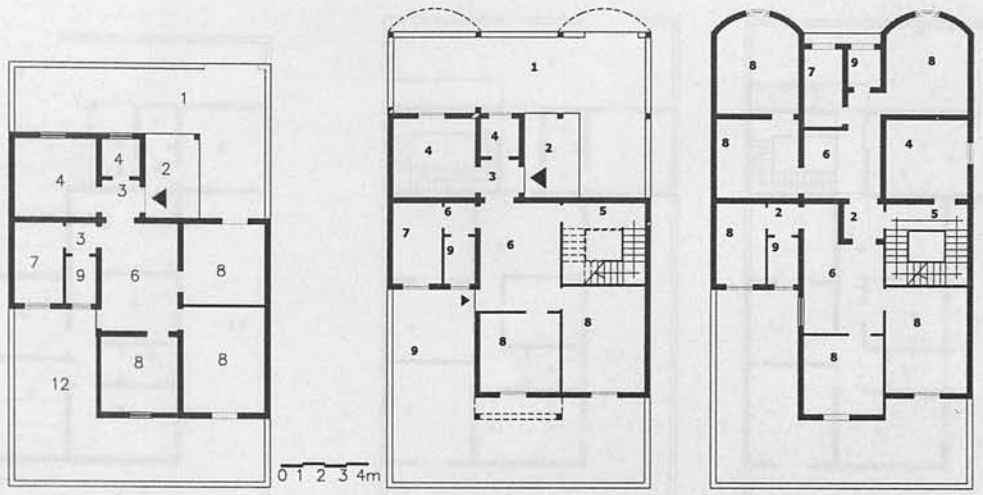
1= Fon yard 2= Lobby 3 = Toilet 4= Guest room 5= Living room
6= Bath room 7= Kitchen 8= Bedroom 9= Back yard

Figure 5

Dwelling type: A

Type of changes:

- Adding staircase in the front yard
- Converting bedroom to setting room and adding new door from this space leading to vertical circulation element
- Converting internal wall to an arch
- Adding new flat on the roof



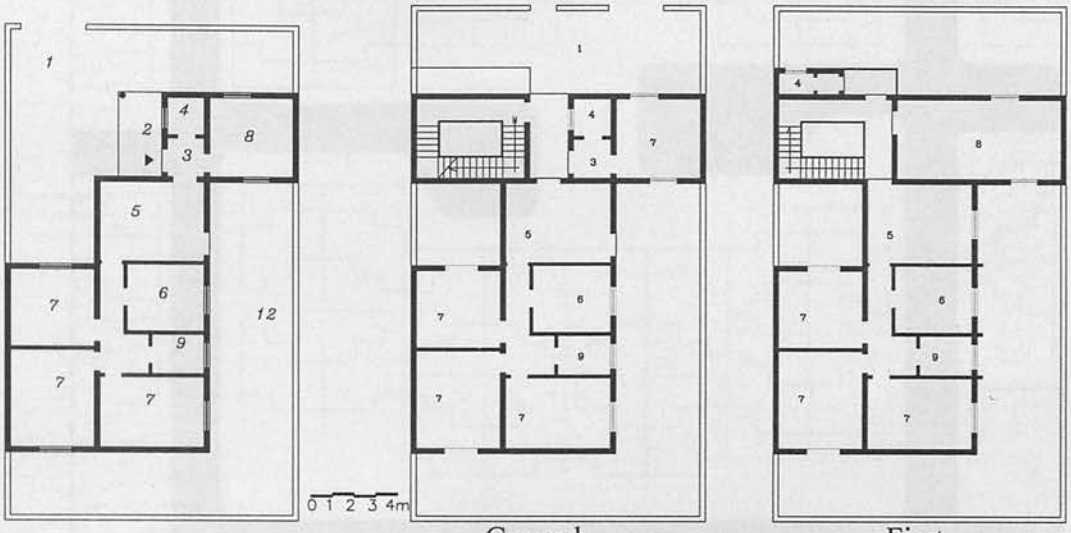
1= Front yard 2= Entrance 3= Lobby 4= Toilet 5= Staircase
6= Living room 7= Kitchen 8= Bedroom 9= Bath room 10= Bedroom
11= Guest room

Figure6

Dwelling type: A

Type of changes:

- Constructing columns in the front and backyard
- Adding two new flats on the roof
- Converting bed room to staircase inside the dwelling



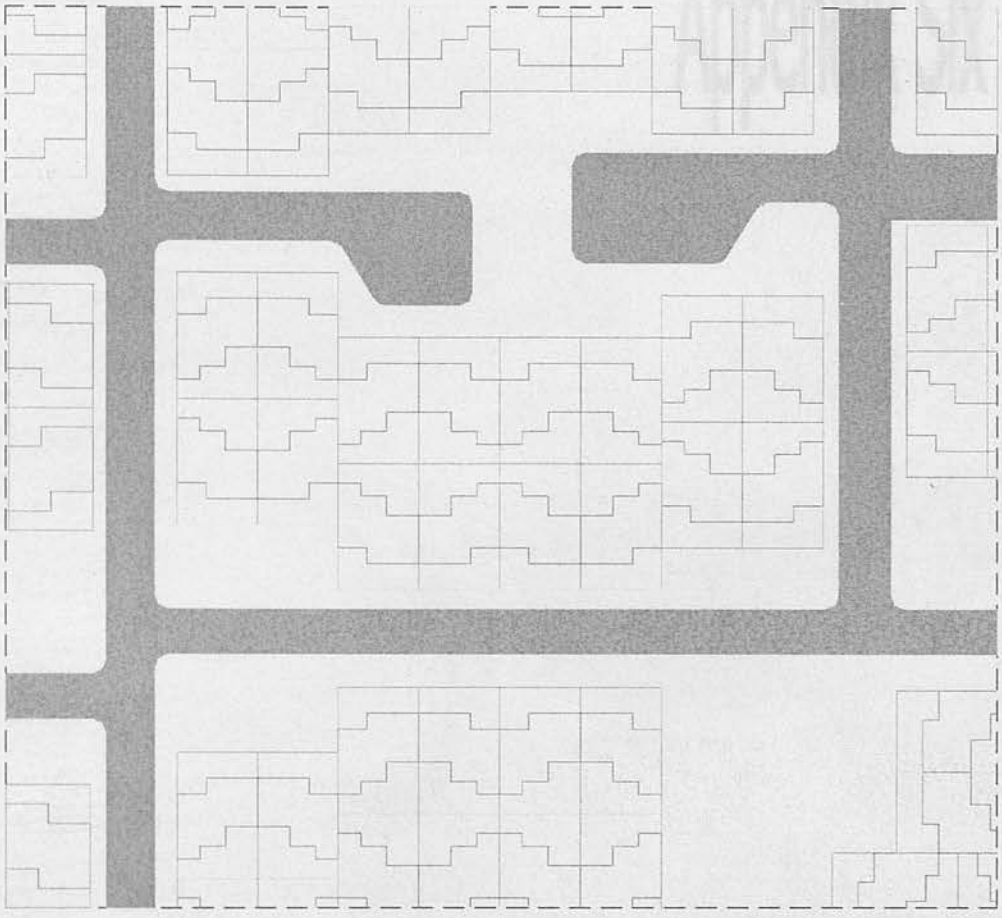
1= Front yard 2= Enterance 3= lobby 4= Bath room
5= Living room 6= Kitchen 7= Bedroom 8= Guest room
9= Bath room 10= Back yard

Figure 7

Dwelling type: B

Type of changes:

- In the ground floor plane new complete roofed staircase in the front yard was added and new entrance lobby
- New floor has been added on the roof.
- The guest room was transferred to the first floor.
- New gust toilet was added in the first floor



An example of dwellings lay out in el-Drabi neighbourhood.

Appendix Six

Calculation of mean depth and relative asymmetry

(1)Measurment of integration

The equation used is as as follows:

$$RA = \frac{2(MD-1)}{K-2}$$

RA = Relative asymmetry (relations of depth)
MD = Mean depth
K = Number of spaces in the system.

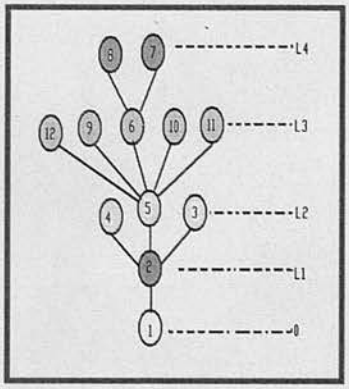
(2) Mean depth

The equation used is as follows:

Multiply the number of spaces at each level by the level they are on, add them together and divide by the total number of spaces in the system.

Calculation of the original plan type A

MD= (1×1)+(2×3)+(3×5)+(4×2)÷12= 2.5
RA= $\frac{2(2.5-1)}{12-1}$ = 0.27



Entrance:
MD= (1×4)+(2×5)+(3×2)÷12= 1.7
RA= $\frac{2(1.7-1)}{12-1}$ = 0.29

Guest room:
MD= (1×2)+(2×2)+(3×5)+(4×2) ÷12= 1.8
RA= $\frac{2(1.8-1)}{12-1}$ = 0.16

Living room:
MD= (1×6)+(2×5) ÷12= 1.3
RA= $\frac{2(1.3-1)}{12-1}$ = 0.055